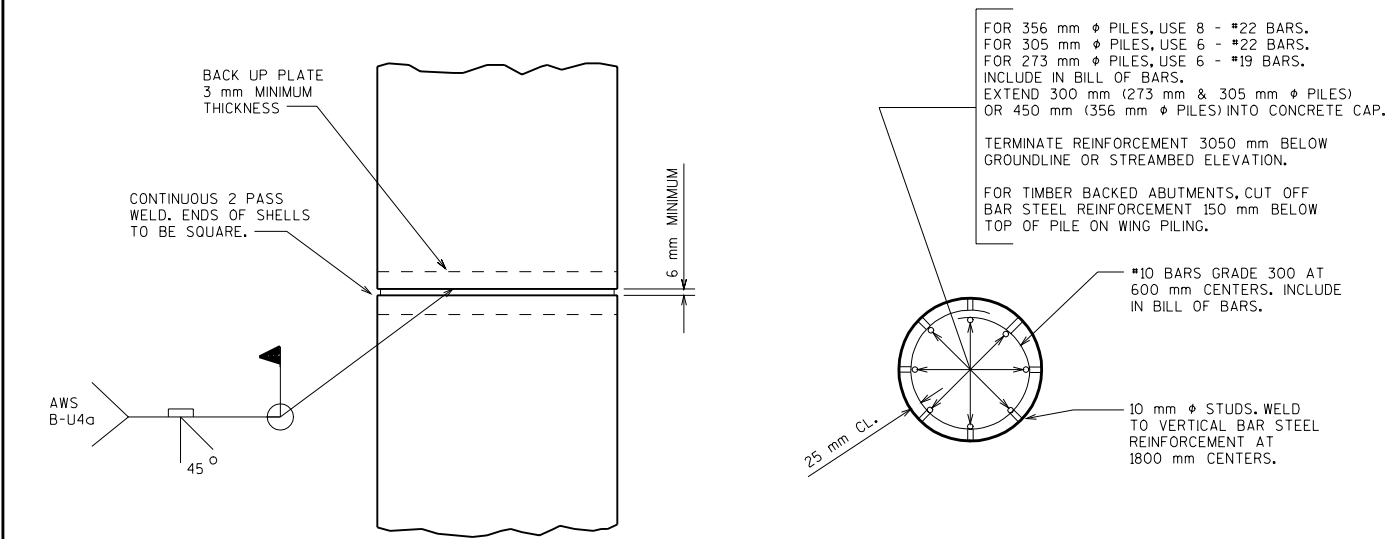


STEEL 'HP' SHAPES



**CAST-IN-PLACE
'PIPE PILE'**

**SECTION THRU CONCRETE
CAST-IN-PLACE PILING
USED WHEN PILES ARE EXPOSED**
(PIER BENTS OR TIMBER BACKED ABUTMENTS)

DESIGNER NOTES

IF PILES ARE EXPOSED IN COMPLETED STRUCTURE AND SUBJECT TO BENDING,
PLACE THE FOLLOWING NOTE ON PLANS:
PILE SPLICES SHALL BE MADE BY A CERTIFIED WELDER USING LOW HYDROGEN ELECTRODES.

IF APPLICABLE, PLACE THE FOLLOWING NOTE ON THE PLANS:
PILES PLACED IN PREBORED HOLES CORED INTO ROCK DO NOT REQUIRE DRIVING.

FULL DESIGN LOADING CAN BE USED IF PREBORED HOLE IS LARGE ENOUGH TO AVOID
PILE HANGUPS AND ALLOW FILLING WITH CONCRETE.

NOTES

CAST-IN-PLACE PILE SHELL MATERIAL SHALL BE A.S.T.M. DESIGNATION A-252, GRADE 2
OR EQUAL.

STEEL 'HP' PILE MATERIAL SHALL BE A.S.T.M. DESIGNATION A36M.

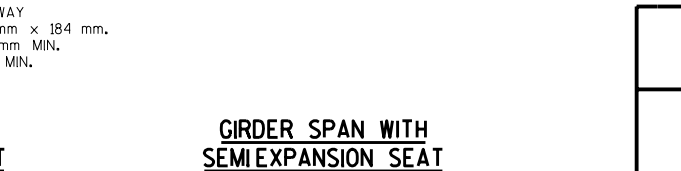
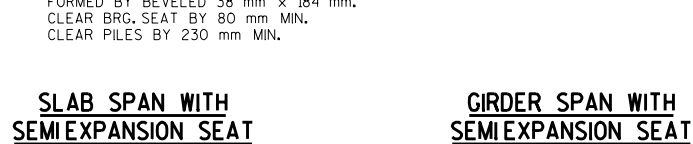
PILE BEARING CAPACITY

- CAST-IN-PLACE:
 - 273 mm DIA. - 490 kN/PILE
 - 305 mm DIA. - 580 kN/PILE
 - 356 mm DIA. - 710 kN/PILE
- STEEL 'HP':
 - MAX. STRESS OF 40 MPa WHERE BOULDERS ARE PRESENT.
 - MAX. STRESS OF 60 MPa WITHOUT LOAD TEST FOR COMPACT SOILS AND SOFT ROCK.
 - MAX. STRESS OF 80 MPa WITHOUT LOAD TEST IF BEARING ON SOUND ROCK.
 - MAX. STRESS OF 110 MPa WITH LOAD TEST IF BEARING ON SOUND ROCK.

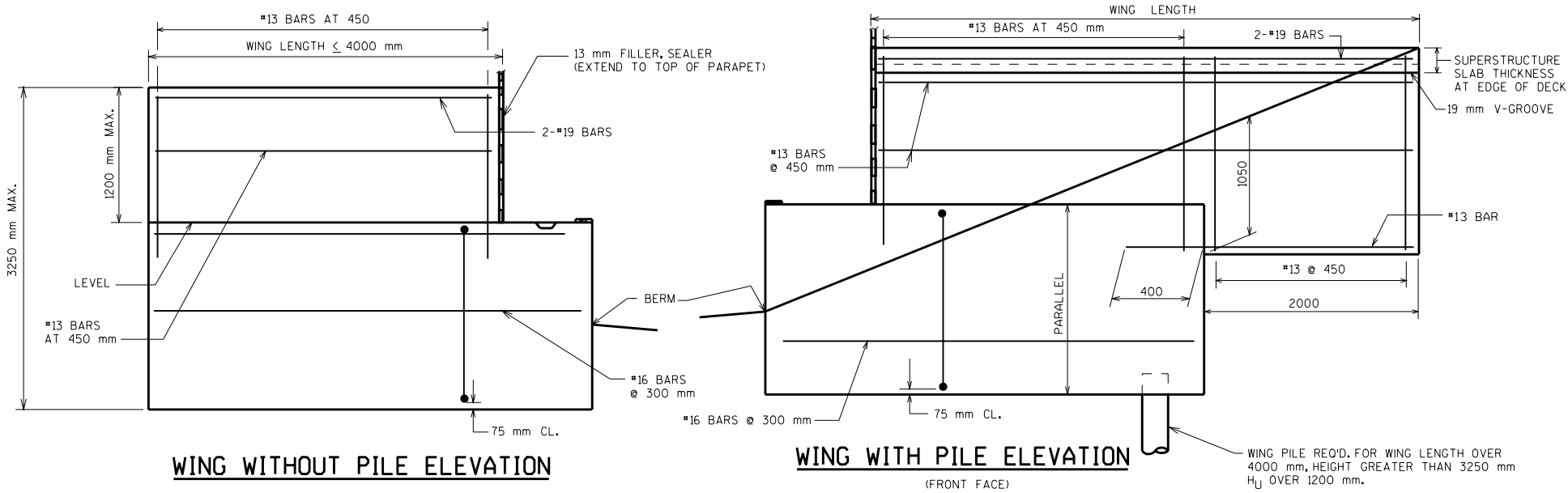
PILE DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 6/02



DISTANCE	BAR SIZE
550	16
650	19
850	22
1100	25
1400	29



DESIGNER NOTES

SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF 13 mm FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (25 mm DEEP AND HOLD 3 mm BELOW SURFACE OF CONCRETE). EXTEND SEALER 75 mm BELOW GUTTER LINE AT INSIDE FACE.

THE SELECTION OF WING 1 OR 2 IS BASED ON THE REQUIRED WING HEIGHT AND LENGTH AND THE LIMITS OF WING HEIGHT AND LENGTH SHOWN.

WHEN TYPE "F", "W" OR "M" STEEL RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

ALL WING BARS ARE EPOXY COATED.

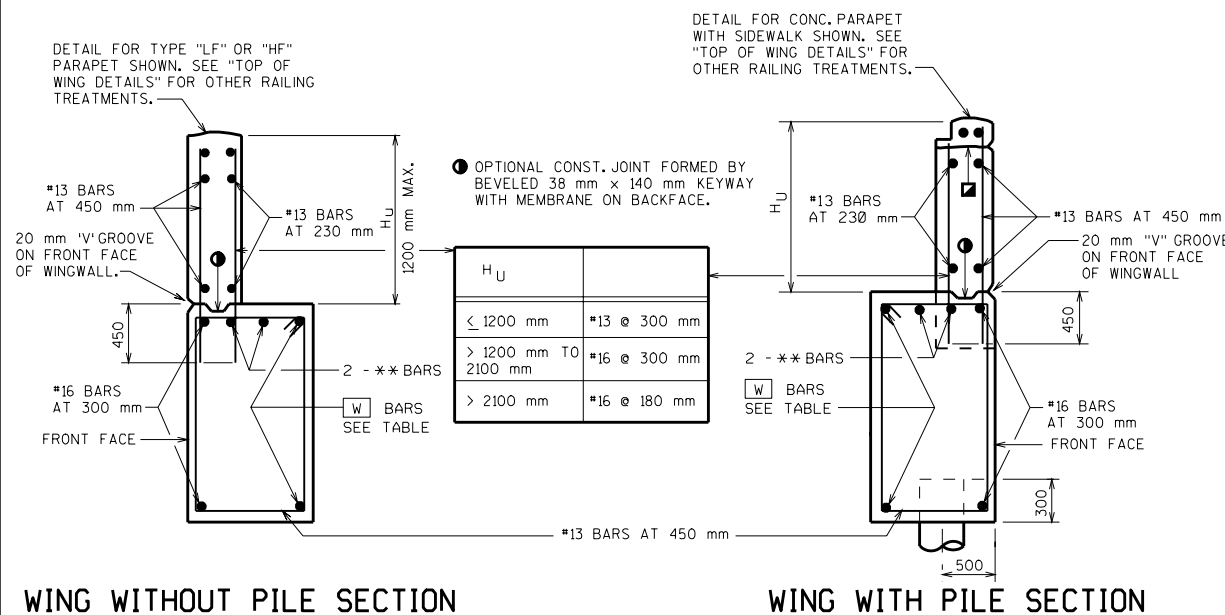
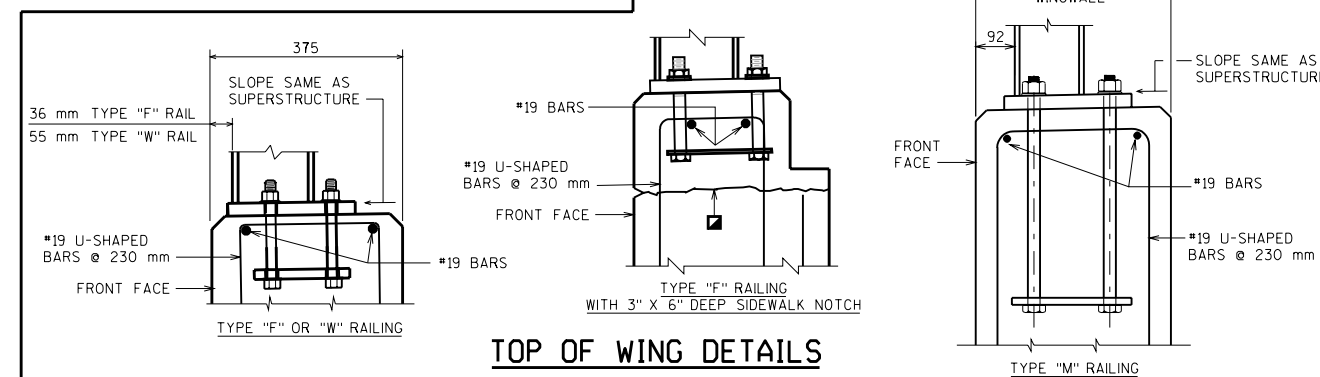
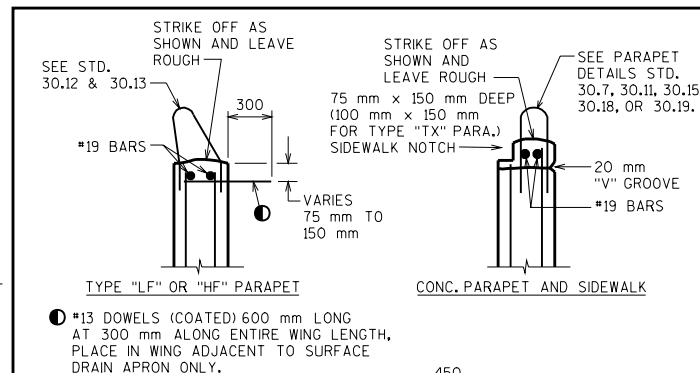
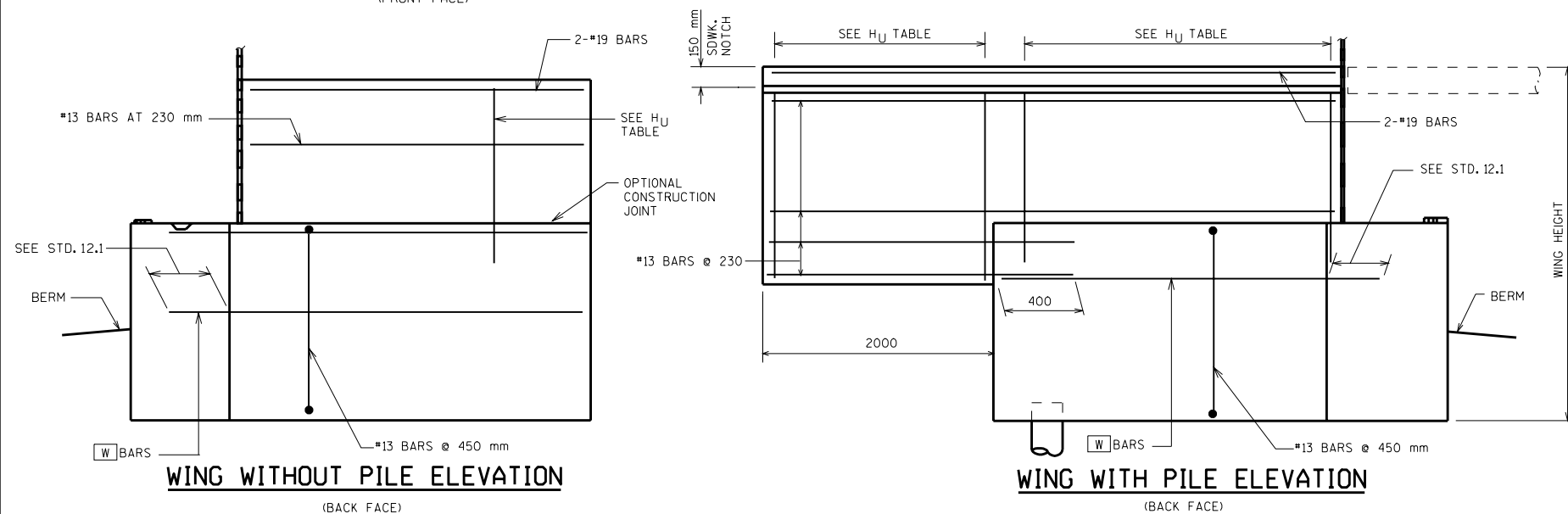
ALL DIMENSIONS ARE IN MILLIMETERS

DESIGN LOADS

LIVE LOAD = 600 mm SURCHARGE
LOAD FACTOR = 1.3 (5/3 LL+5/3E)
 f_y = 420 MPa
 f'_c = 24 MPa
HORIZONTAL EARTH LOAD = 1600 Pa EQUIV. FLUID PRESSURE

WING LENGTH	WING HEIGHT				
	2500	3000	3500	4000	BARS
3000	*5-#22	*5-#22	5-#16		W
	*7-#25	*7-#25	6-#16		A1
4000	*5-#22	*5-#22	6-#16	5-#19	W
	*7-#25	*7-#25	6-#22	7-#22	A1
5000	6-#19	5-#22	6-#22	5-#25	W
	5-#25	6-#25	7-#25	8-#25	A1
6000	6-#22	7-#22	7-#25	6-#29	W
	6-#29	7-#29	7-#32	8-#32	A1

* WING WITHOUT PILE VALUES SHOWN.
(FOR WING WITH PILE THAT HAS WING LENGTHS IN THIS REGION, USE VALUES FOR 3500 mm WING HEIGHT.)



** BARS TO BE SAME SIZE AS "W" BARS

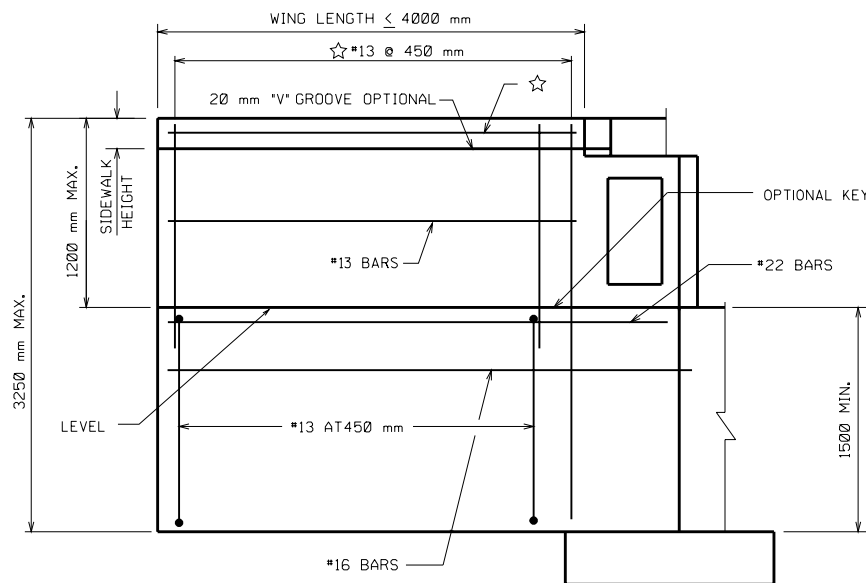
CONSTRUCTION JOINT, LEAVE ROUGH. REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE.

ABUTMENT TYPE A1

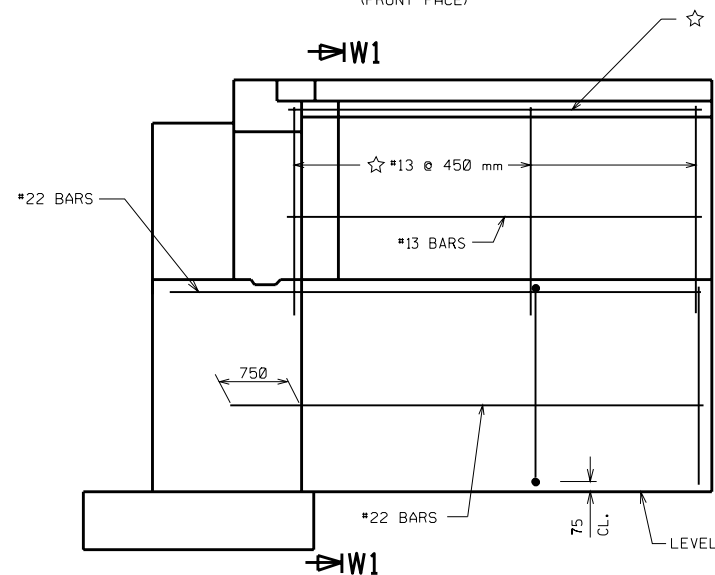
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 6-02

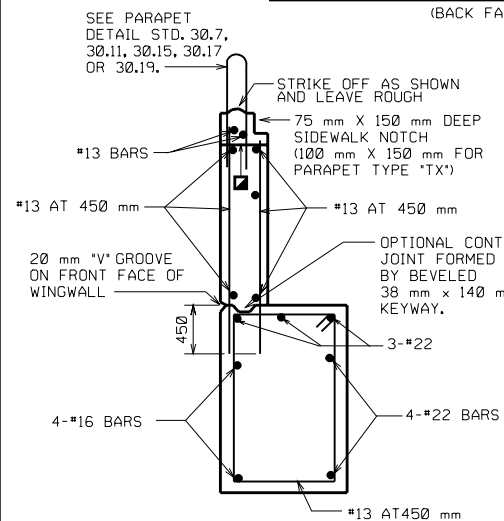
METRIC STANDARD 12.2



WING WITHOUT PILE ELEVATION
(FRONT FACE)



WING WITHOUT PILE ELEVATION
(BACK FACE)

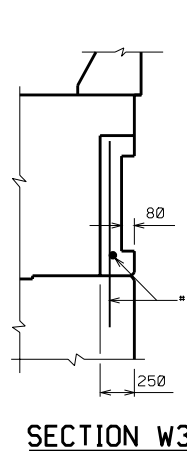


SECTION W1
CONC. PARAPET AND SIDEWALK

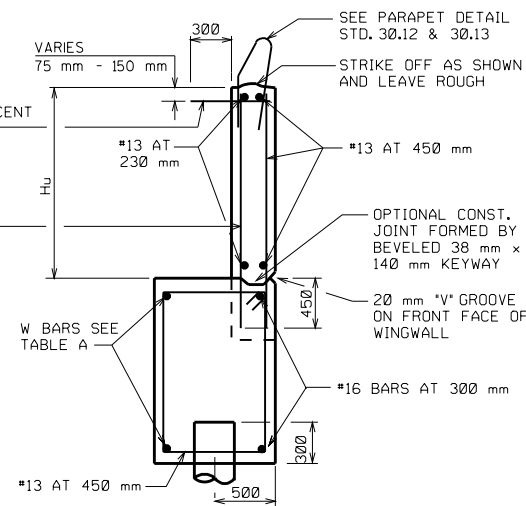
#13 DOWELS 600 mm LONG AT 300 mm ALONG ENTIRE WING LENGTH. PLACE IN WING ADJACENT TO SURFACE DRAIN ONLY.

H_U	
< 1500 mm	#16 AT 300 mm
> 1500 mm TO 2100 mm	#16 AT 300 mm
> 2100 mm	#16 AT 180 mm

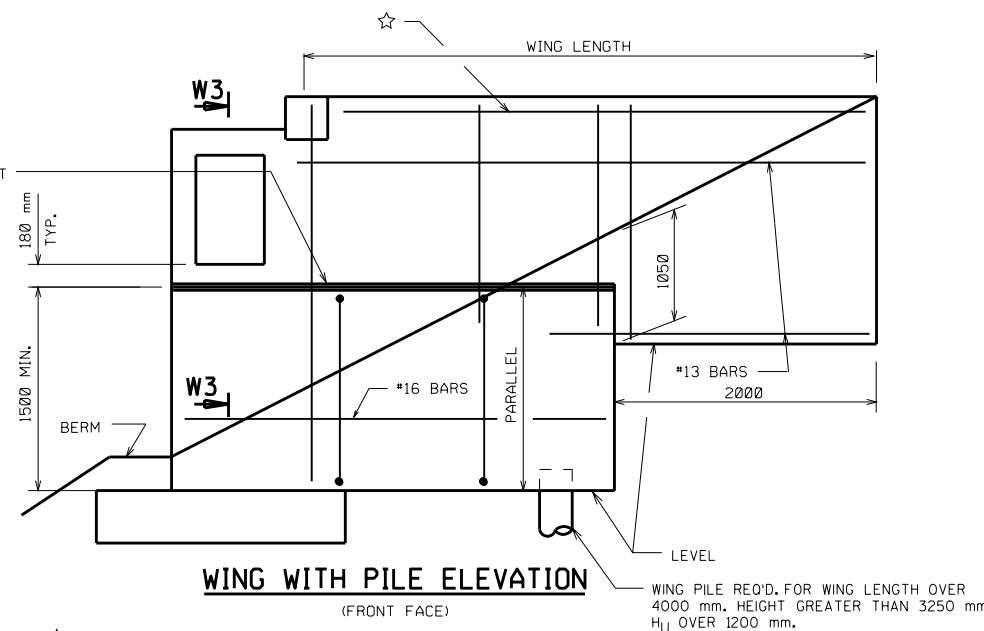
CONSTRUCTION JOINT, LEAVE ROUGH, REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE.



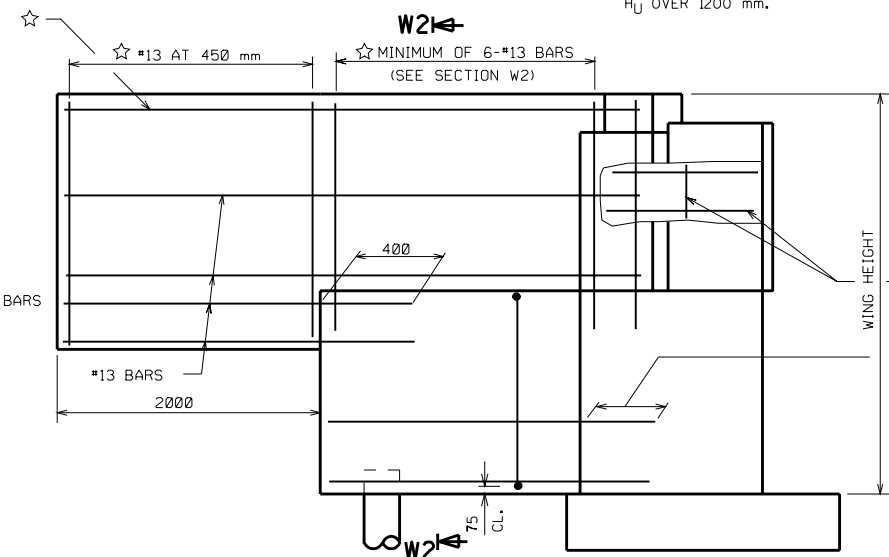
SECTION W3



SECTION W2
TYPE "LF" OR "HF" PARAPET



WING WITH PILE ELEVATION
(FRONT FACE)



WING WITH PILE ELEVATION
(BACK FACE)

DESIGNER NOTES

LENGTH OF A3 BARS SHALL BE \geq TO WING LENGTH.

WING WITH PILE & WING WITHOUT PILE CAN BE USED FOR EITHER SIDEWALK OR SLOPED FACE PARAPETS. THE TYPE OF WING TO USE IS BASED ONLY ON THE WING HEIGHT AND WING LENGTH LIMITATIONS SHOWN.

LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

FRONT ROW PILES ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 1900 Pa AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID PRESSURE OF 950 Pa AND "P".

\star IF "F", "W", OR "M" STEEL RAILING IS ATTACHED TO TOP OF WINGS INSTEAD OF PARAPETS AS SHOWN, SEE DETAIL A.

WHEN TYPE "F", "W", OR "M" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

ALL WING BARS SHALL BE EPOXY COATED.

ALL DIMENSIONS ARE IN MILLIMETERS

FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK: IF SIDEWALL IS USED, FORM SIDEWALL 50 mm BELOW CONC. DIAPH.

DESIGN LOADS

HORIZONTAL EARTH LOAD = 1600 Pa
 EQUIV. FLUID PRESSURE.
 LIVELOAD = 600 mm SURCHARGE
 LOAD FACTOR (WINGS) = 1.3 (5/3 LL + 5/3 E)
 LOAD FACTOR (BODY) = 1.3 (5/3 LL + 1.3 E)
 $f_y = 420$ MPa
 $f'_c = 24$ MPa

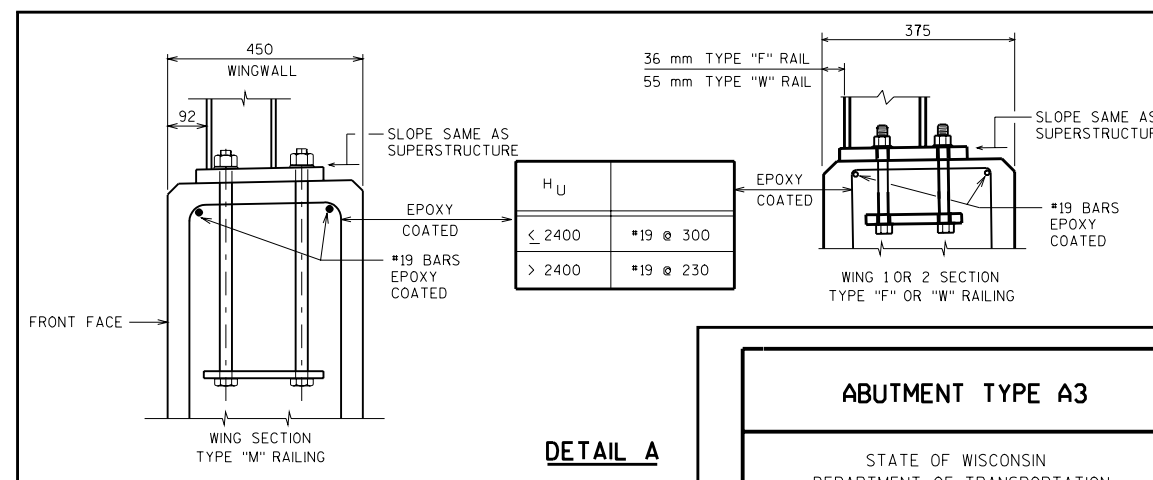
TABLE A

WING 2 LENGTH	WING 2 HEIGHT				BARS
	3000	3500	4000	4500	
4000		5-#16	—	—	W
		6-#16	—	—	A3
5000	5-#19	6-#19	5-#22	—	W
	6-#19	4-#25	6-#22	—	A3
6000	6-#22	5-#25	6-#25	7-#25	W
	4-#29	5-#29	6-#29	7-#29	A3
7000	7-#25	7-#29	6-#32	7-#32	W
	6-#29	7-#29	7-#32	8-#32	A3
8000	6-#32	7-#32	6-#32 [†]	7-#32 [†]	W
	6-#32	8-#32	8-#32 ^{††}	9-#32 ^{††}	A3

[†] USE 1400 mm FOR LOWER WING POUR WIDTH
^{††} USE 1000 mm MIN. FOR BEARING SEAT WIDTH

SIDE WALL REINF. #13
 BARS AT 300 mm CTRS.
 (EMBED 400 mm)

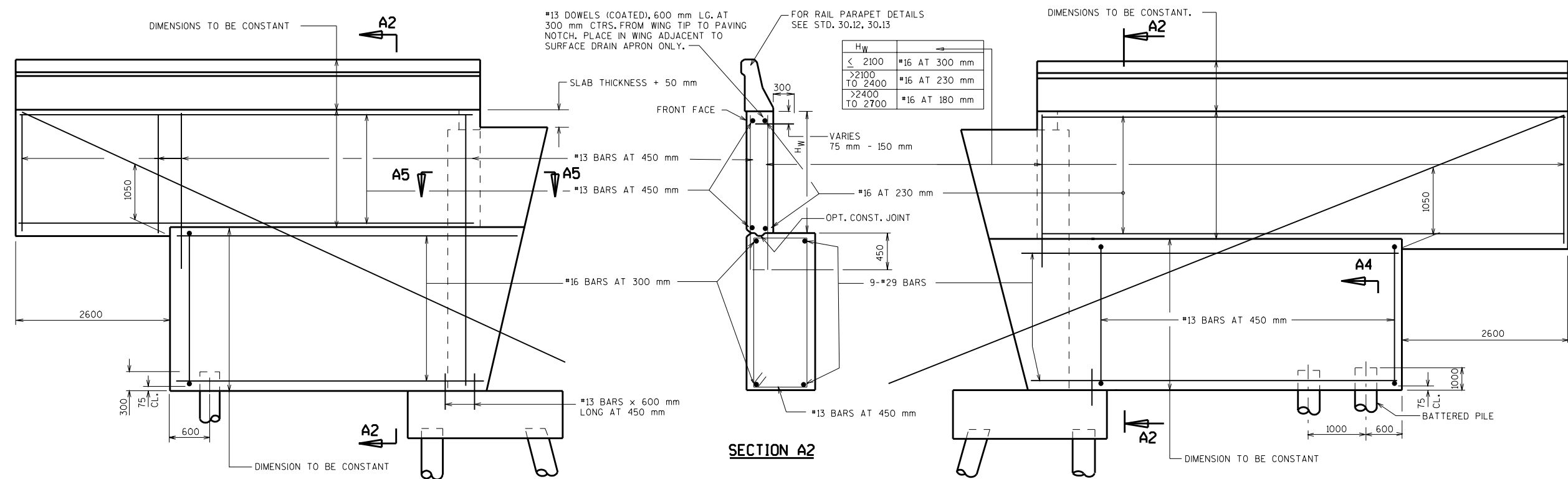
\geq	LENGTH
#16	450
#19	550
#22	750
#25	950
#29	1150
#32	1350



ABUTMENT TYPE A3

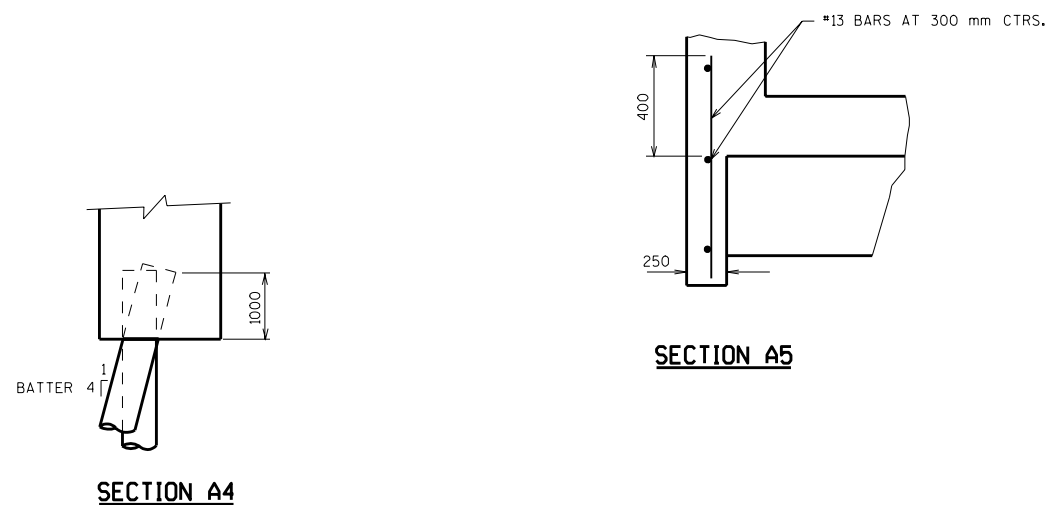
STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 6-02



WING ELEVATION

WING LENGTH OVER 8000 mm TO 9000 mm (SHOWING BACK FACE BAR STEEL WING REINFORCEMENT) SEE 8000 mm WING FOR F.F. REINFORCEMENT.



DESIGNER NOTES

BODY IS DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 1900 Pa, 600 mm SURCHARGE AND SUPERSTRUCTURE REACTIONS "P".

WINGS ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 1600 Pa AND A 600 mm SURCHARGE. A 45 kN LATERAL RESISTANCE IS USED FOR THE GROUP OF 2 WING PILES. NO LATERAL RESISTANCE IS USED FOR SINGLE PILES IN WING.

FRONT ROW PILES ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 1900 Pa AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID PRESSURE OF 950 Pa AND "P".

UNIT WEIGHT OF SOIL IS ASSUMED AS 19 kN PER Cu. m.

BRIDGE SEATS BETWEEN BEARINGS SHALL SLOPE 25 mm FROM FRONT FACE OF BACKWALL.

$f_y = 420$ MPa
 $f'_c = 24$ MPa
 LOAD FACTOR (BODY) = 1.3 (5/3 LL + 1/3 E)
 LOAD FACTOR (WINGS) = 1.3 (5/3 LL + 5/3 E)

PAY LIMITS FOR EXCAVATION FOR STRUCTURES & GRANULAR BACKFILL IS SHOWN IN CHAPTER 12 OF THE BRIDGE MANUAL.

ALL WING BARS SHALL BE EPOXY COATED.

WHEN TYPE "F", "W", OR "M" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

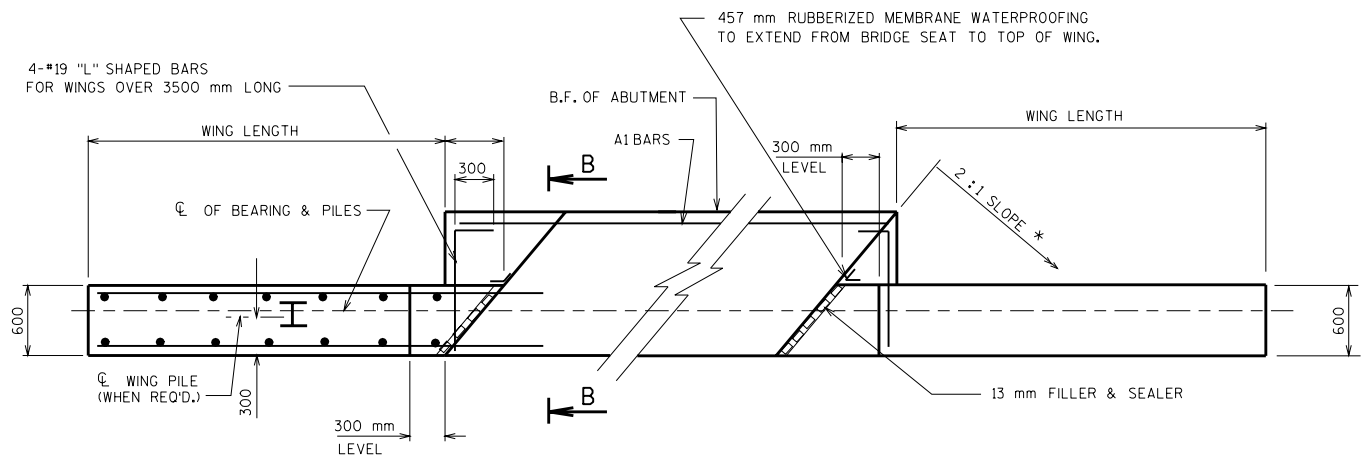
FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK; IF SIDEWALL IS USED, FORM SIDEWALL 50 mm BELOW CONC. DIAPH.

ALL DIMENSIONS ARE IN MILLIMETERS.

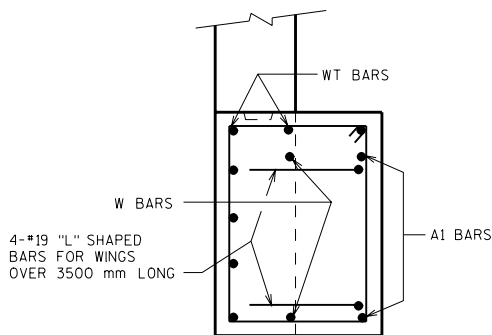
ABUTMENT A4 PILE FOOTING

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1-02

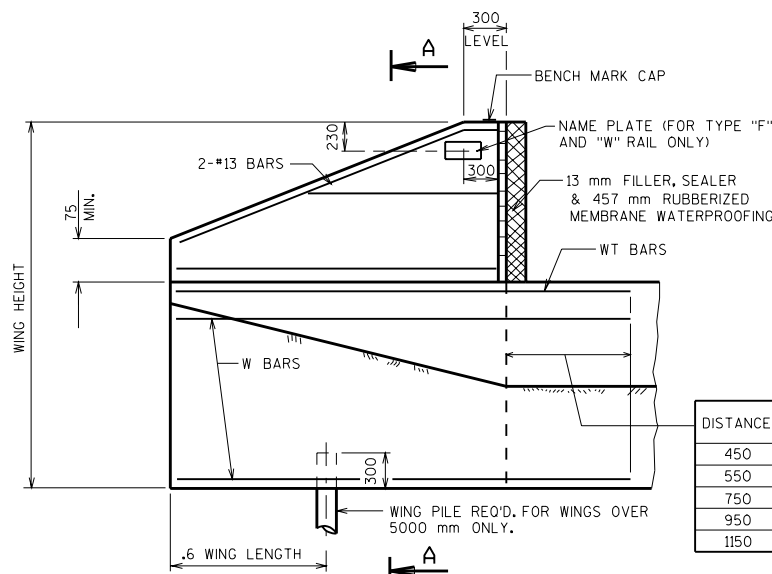


PLAN FOR TYPE A1 ABUTMENT

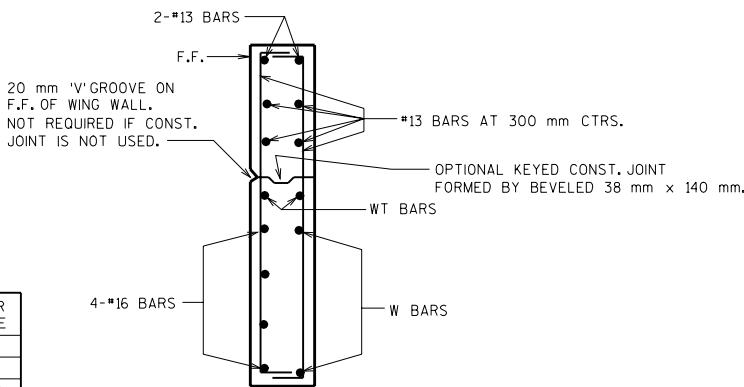


SECTION B-B

SEE STD. 12.1 & 12.2 FOR NOTES & DETAILS



WING ELEVATION
(A1 ABUTMENT)



SECTION A-A

DESIGNER NOTES

THIS TYPE OF WING MAY BE USED IN LIEU OF WINGS PARALLEL TO ROADWAY IF APPROVED BY THE BUREAU OF STRUCTURES DESIGN SECTION. DO NOT USE FOR STREAM CROSSINGS WHEN HIGH WATER ELEVATION IS ABOVE TOP OF BERM ELEVATION.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

*USE 2 1/2:1 FOR THE UNSTABLE CLAYS WHICH ARE SOMETIMES ENCOUNTERED IN NORTHWEST WISC. (SUPERIOR AREA)

DESIGN LOADS (WINGS)

LIVE LOAD = 300 mm SURCHARGE
LOAD FACTOR = 1.3 (5/3 LL + 5/3 E)
HORIZONTAL EARTH LOAD = 1600 Pa EQUIV.
FLUID PRESSURE
fy = 420 MPa
fc = 24 MPa

TABLE A

WING LENGTH	WING HEIGHT				
	2500	3000	3500	4000	BARS
3000	4-#16	4-#16	5-#16	—	W
	2-#16	2-#16	2-#16	—	WT
	4-#19	4-#19	4-#19	—	A1
4000	—	4-#22	5-#22	4-#25	W
	—	2-#22	2-#22	2-#25	WT
	—	4-#19	5-#19	4-#22	A1
5000	—	5-#25	6-#25	5-#29	W
	—	2-#25	2-#25	2-#29	WT
	—	6-#19	4-#25	6-#22	A1
6000	—	—	8-#25	8-#29	W
	—	—	2-#25	2-#29	WT
	—	—	6-#25	7-#25	A1

▲ WING PILE REQUIRED

DETAILS FOR WINGS PARALLEL TO A1 ABUTMENT CENTERLINE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1-02

SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF 13 mm FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (25 mm DEEP AND HOLD 3 mm BELOW SURFACE OF CONC.)

7 457 mm RUBBERIZED MEMBRANE WATERPROOFING.

FOR SLAB AND PRESTRESSED GIRDER SPANS $L < 61000$ mm
& FOR STEEL GIRDER SPANS $L < 46000$ mm WHERE L = LENGTH
OF CONTINUOUS SUPERSTRUCTURE BETWEEN ABUTMENTS.

★ WHEN BODY SECTION IS $> \pm 15000$ mm LONG, PROVIDE VERT. CONST. JOINT. RUN BAR STEEL THRU JOINT. BEVEL EXPOSED EDGES 20 mm AND SEAL JOINT.

800 MIN.
400 400 MIN. C ABUT.

KEYED CONST. JOINT FORMED BY BEVELED 38 mm X 140 mm

19 mm X 100 mm FILLER

3 - #13 TIE BARS AT 1200 mm HORIZ. SPA.

8 - #16 BARS

#13 @ 300 mm

TOP OF BERM

HEAVY RIPRAP

1 1/2

600

750 mm BERM

750 600 915

150

450 mm MIN. 1070 mm MAX.

300

8 - #25

B.F.

"H"

120 LEG

50 mm DIA. WEEP HOLE AT 6000 mm SPA. USE GEOTEXTILE FABRIC WITH SIZE 1 COARSE AGGREGATE AT EACH HOLE (ON B.F. 300 mm X 300 mm X 300 mm MIN.) COST INCIDENTAL TO "CONCRETE MASONRY, BRIDGES".

#13 @ 300 mm

75 CL.

300

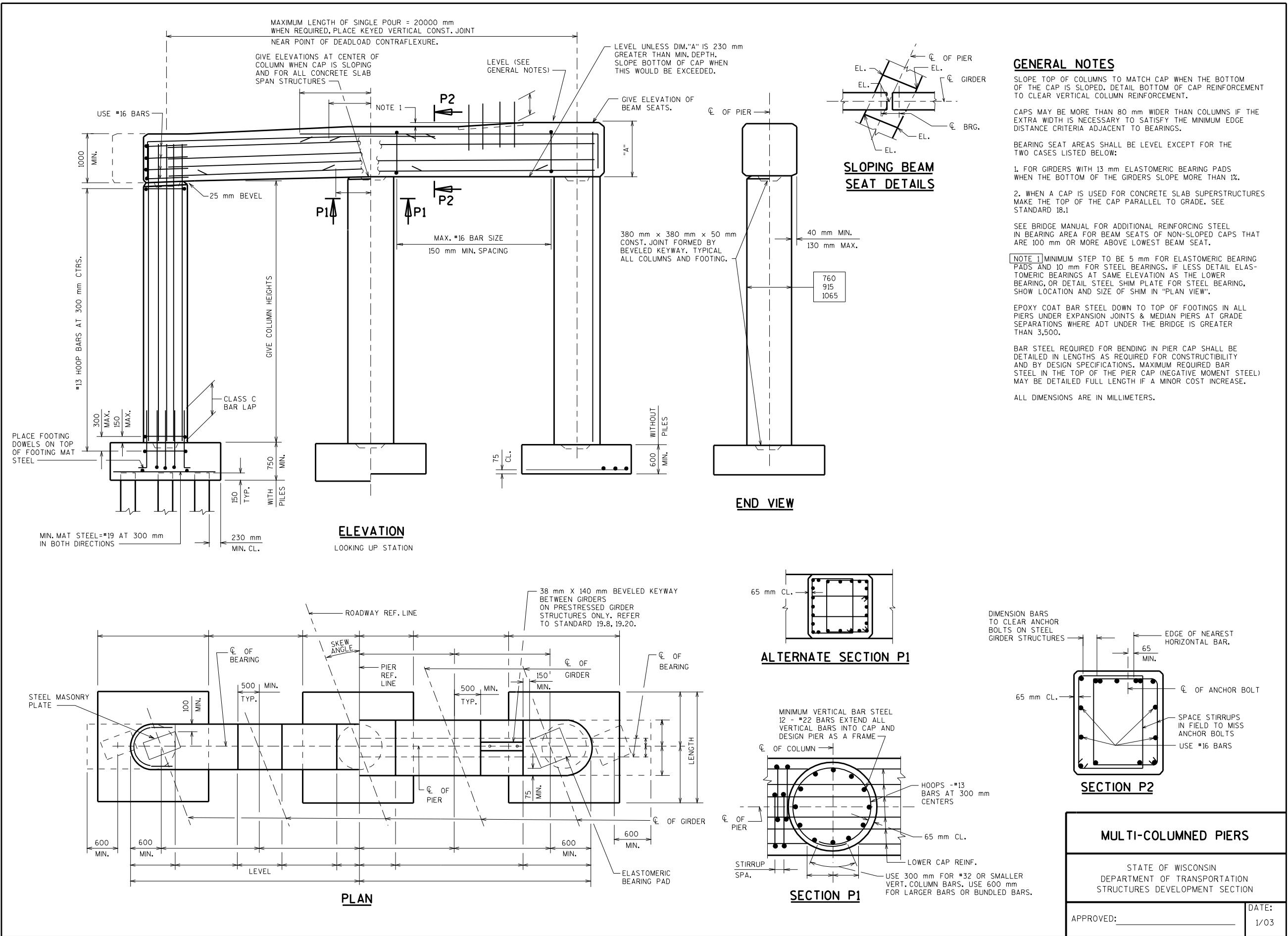
PILES TO BE DESIGNED. (STEEL "H" OR C-I-P CONC.) MAXIMUM SPA. 2500 mm.

"H" MINIMUM 1525 mm
"H" MAXIMUM 3050 mm



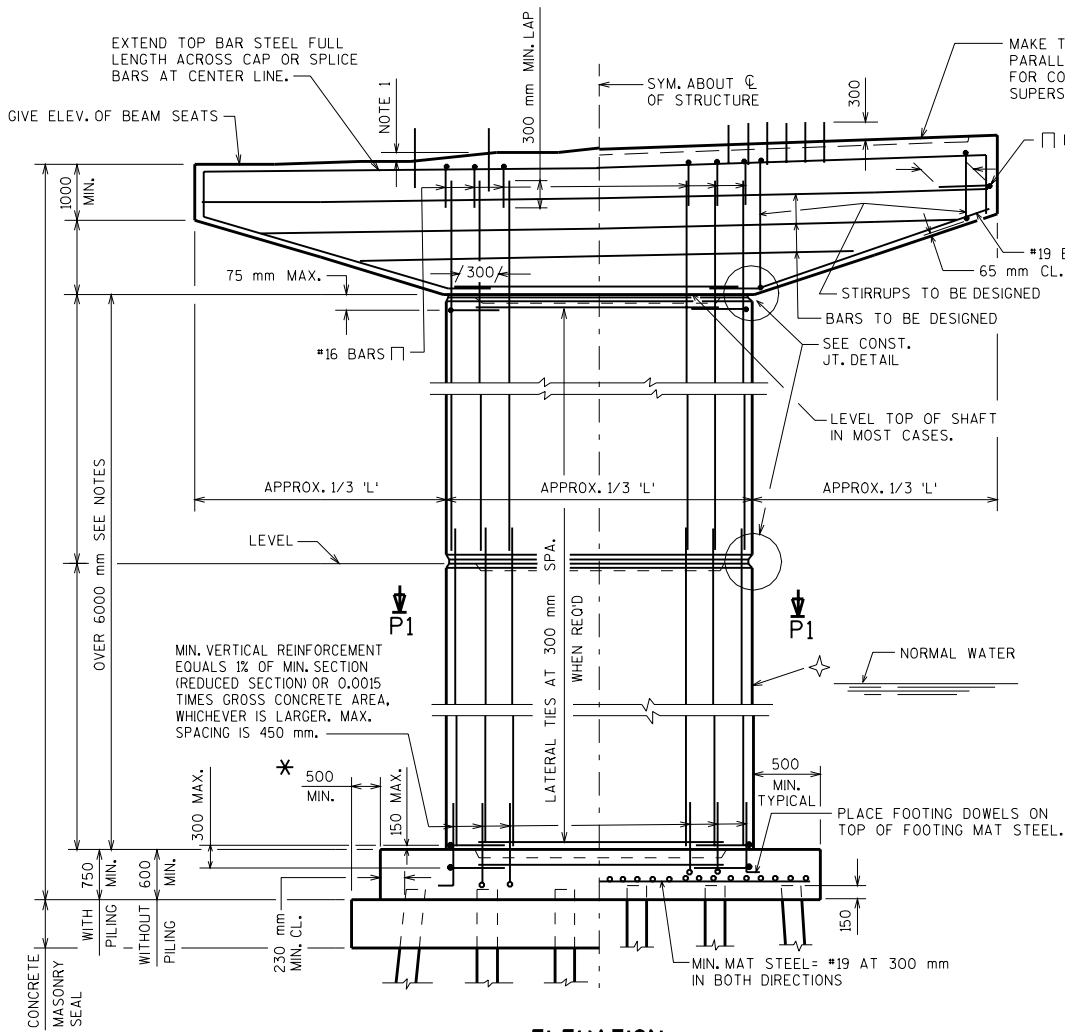
1-02

METRIC STANDARD 12.8



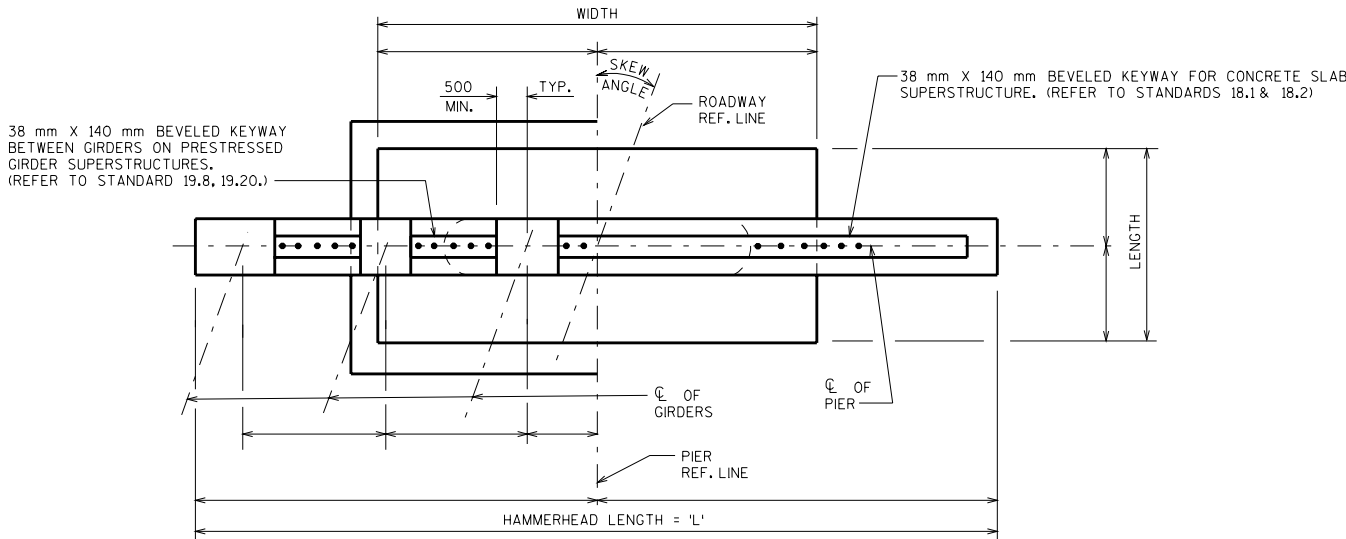
GIRDER STRUCTURES

CONCRETE SLAB STRUCTURES

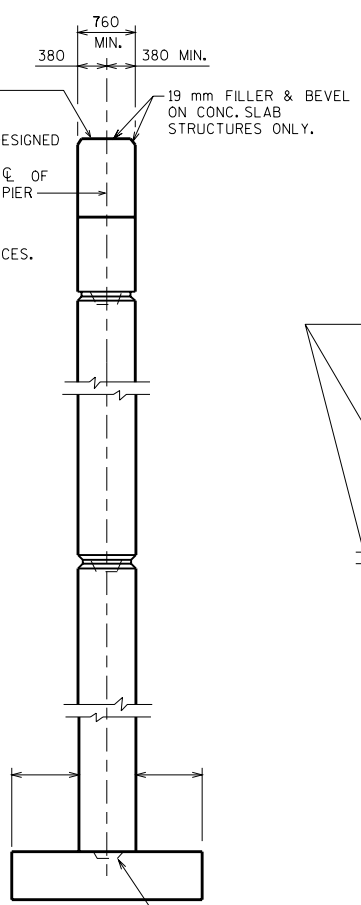


ELEVATION

LOOKING UP STATION

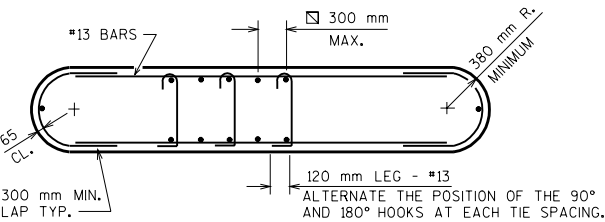


PLAN

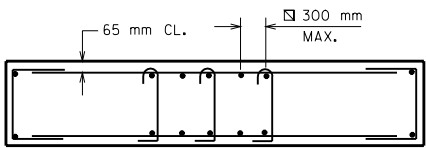


END VIEW

CONST. JT. DETAIL



SECTION P1



ALTERNATE SECTION P1

GENERAL NOTES

NOTE 1 MINIMUM STEP TO BE 5 mm FOR ELASTOMERIC BEARING PADS AND 10 mm FOR STEEL BEARINGS, IF LESS, DETAIL ELASTOMERIC BEARINGS AT SAME ELEVATION (LOWER ONE) OR DETAIL STEEL SHIM PLATE FOR STEEL BEARING. SHOW LOCATION AND SIZE OF SHIM IN "PLAN VIEW". AT THE DESIGNERS OPTION A SLOPE MAY BE USED BETWEEN BEAM SEATS.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT SHALL BE PLACED APPROXIMATELY 600 mm ABOVE NORMAL WATER ELEVATION. OPTIONAL KEYED CONSTRUCTION JOINT IN SHAFT SHALL BE USED IN ORDER THAT MAXIMUM HEIGHT OF POUR DOES NOT EXCEED 6000 mm. RUSTICATIONS SHOWN IN "CONST. JT. DETAIL" MAY BE OMITTED AT THE OPTION OF THE DESIGNER.

KEYED CONSTRUCTION JOINTS SHALL BE FORMED BY BEVELED KEYWAY 100 mm DEEP X 1/3 THICKNESS OF SHAFT X 1000 mm LESS THAN LENGTH OF SHAFT.

A STANDARD SHAFT TAPER OF 10% MAY BE USED AT THE OPTION OF THE DESIGNER. (LATERAL DIRECTION ONLY)

SHAFT MAY BE TAPERED IN ONE OR TWO DIRECTIONS WHEN REQUIRED FOR STRUCTURAL REASONS.

A NON-STANDARD SHAFT CROSS-SECTION, SHAPE, OR TAPER, NOT REQUIRED FOR STRUCTURAL REASONS, MAY BE USED ONLY WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

SEE BRIDGE MANUAL FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 100 mm OR MORE ABOVE THE LOWEST BEAM SEAT.

INCREASE THIS DIMENSION IF NECESSARY TO PREVENT BATTERED PILES FROM DRIVING INTO SHEET PILING.

THIS MAXIMUM SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA. VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS LESS THAN 0.01 TIMES GROSS CONCRETE AREA AND VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

SEE STANDARD 13.1 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.

EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS UNDER EXPANSION JOINTS & MEDIAN PIERS AT GRADE SEPARATIONS WHERE ADT UNDER THE BRIDGE IS GREATER THAN 3500.

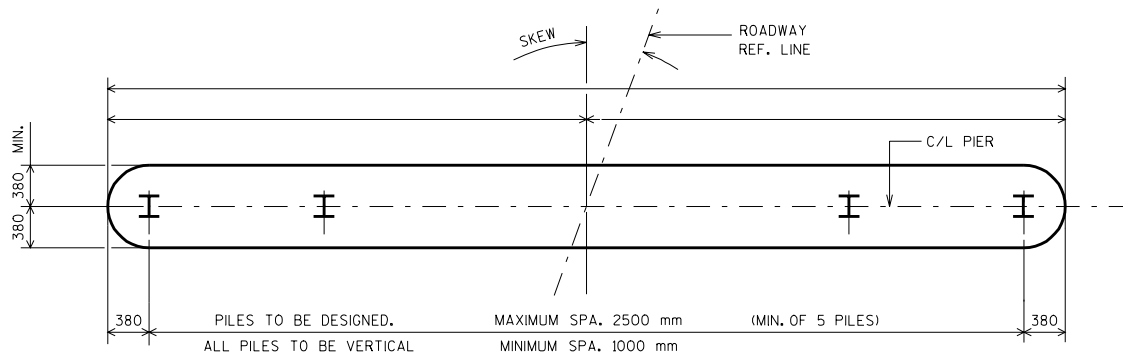
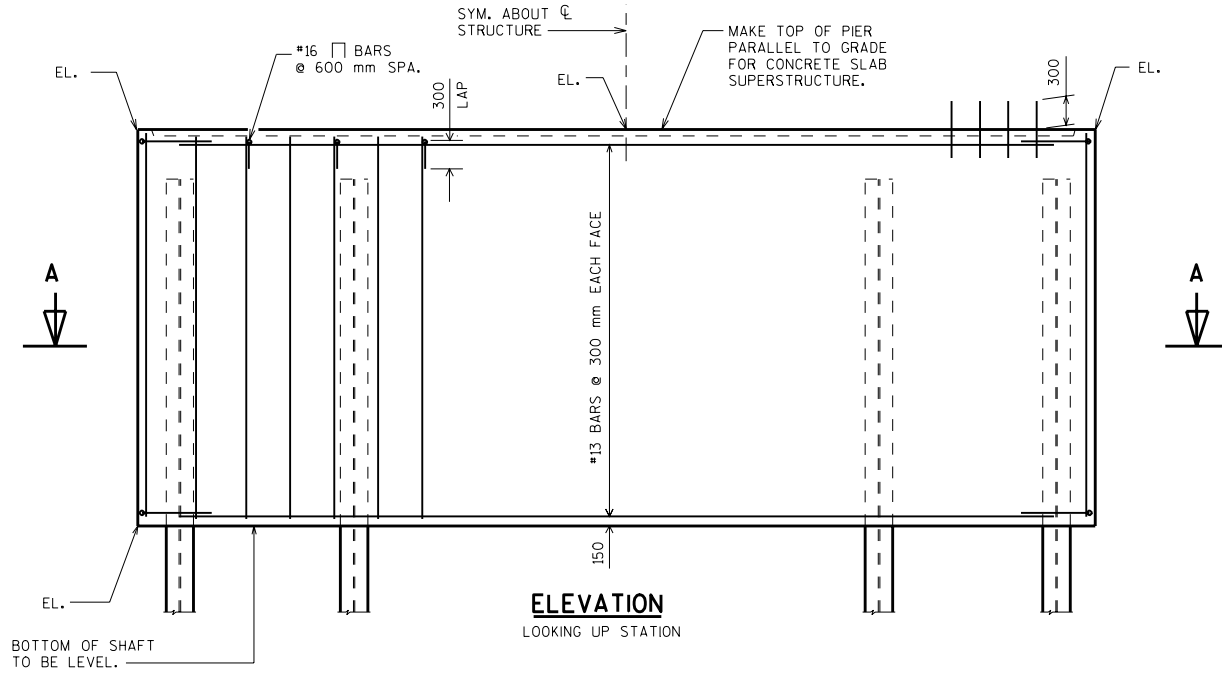
ALL DIMENSIONS ARE IN MILLIMETERS.

HAMMERHEAD PIER

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

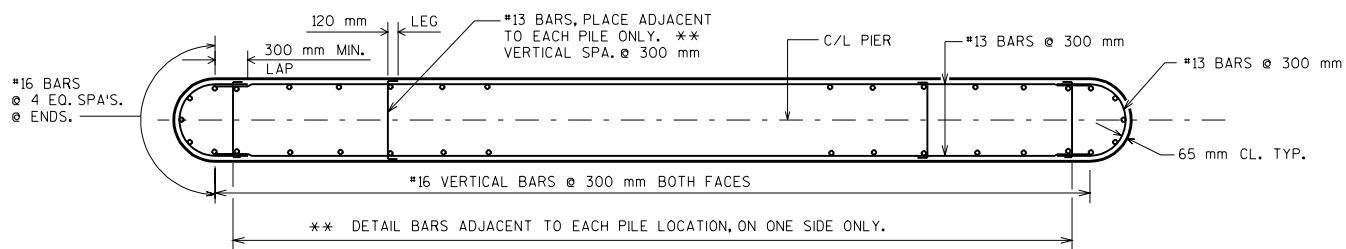
APPROVED: _____ DATE: 1/03

ALL DIMENSIONS ARE IN MILLIMETERS.

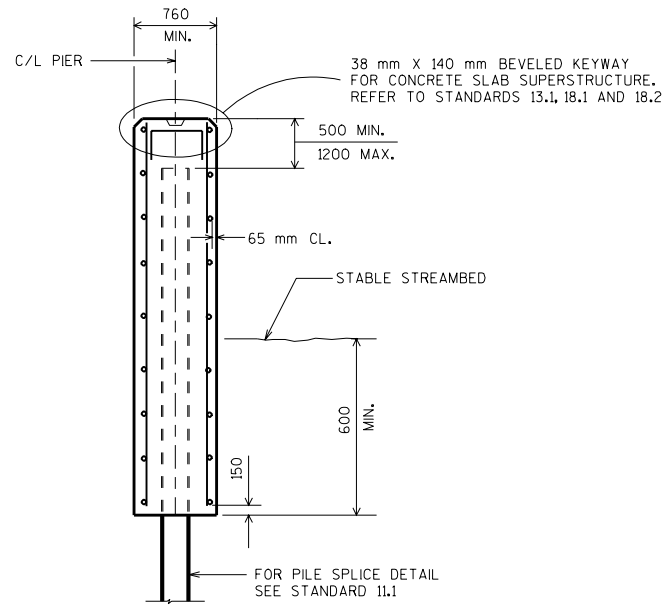


PLAN

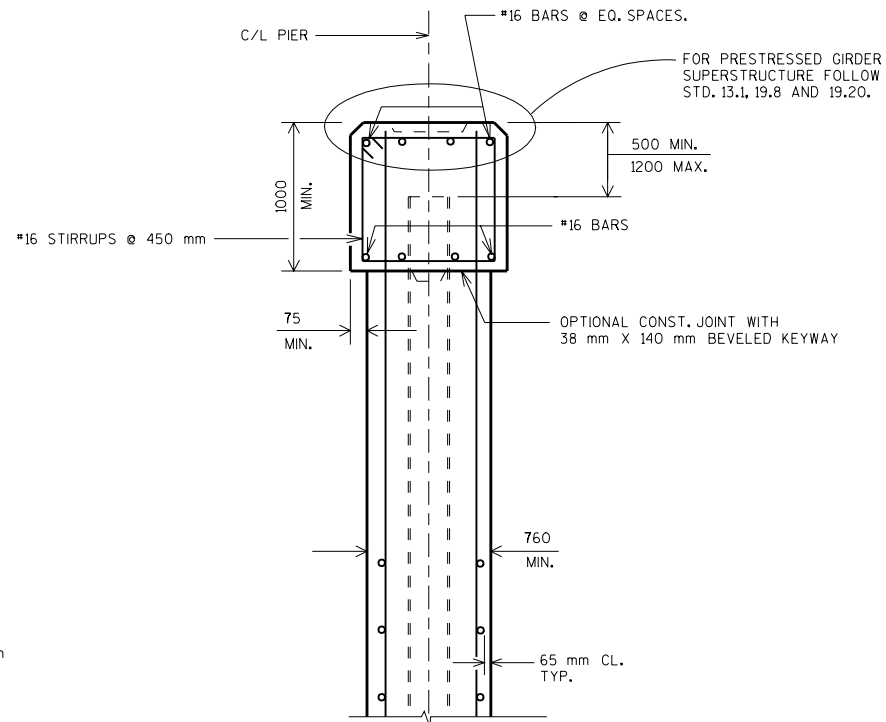
STEEL PILING SHOWN. CAST IN PLACE
CONC. PILING LAYOUT SIMILAR.



SECTION A



END VIEW



CAP TYPE DETAIL

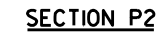
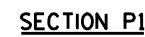
USE WHEN ECONOMICAL FOR GIRDERS
ON LARGE SKEWS.

PILE ENCASED PIER

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

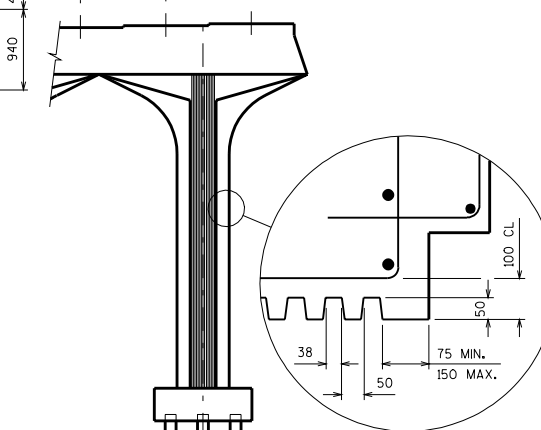
APPROVED: _____

DATE:
1/03



GENERAL NOTES

ALL DIMENSIONS ARE IN MILLIMETERS.

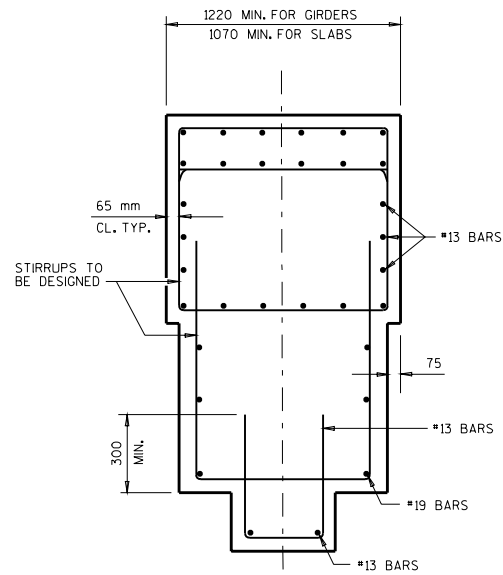


TEXTURING LIMITATIONS OF PIER COLUMN
(EACH FACE)

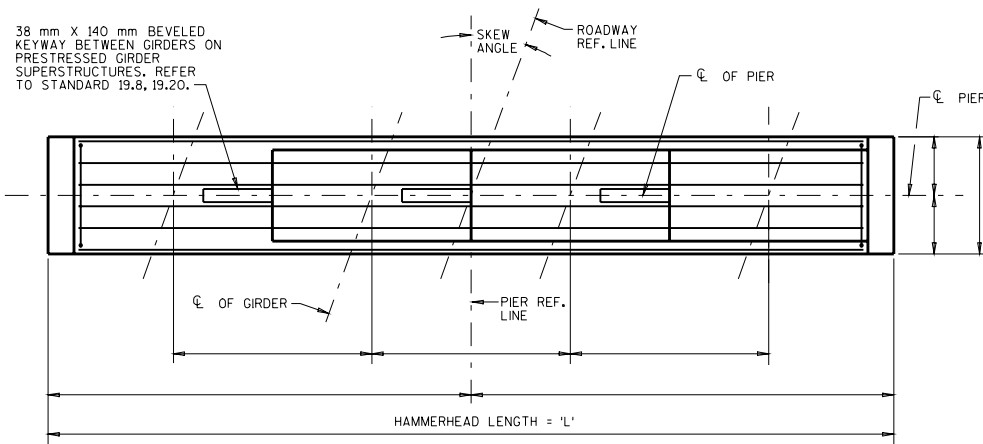
MULTI-COLUMNED PIER
TYPE 2

APPROVED: _____	DATE: 1/03
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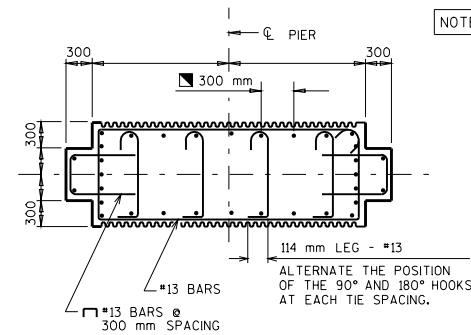
METRIC STANDARD 13.4



SECTION P1



PLAN OF PIER CAP



SECTION P2

NOTE 1 MINIMUM STEP TO BE 5 mm FOR ELASTOMERIC BEARING PADS AND 10 mm FOR STEEL BEARINGS. IF LESS, DETAIL ELASTOMERIC BEARINGS AT SAME ELEVATION (LOWER ONE) OR DETAIL STEEL SHIM PLATE FOR STEEL BEARING. SHOW LOCATION AND SIZE OF SHIM IN "PLAN VIEW". AT THE DESIGNERS OPTION A SLOPE MAY BE USED BETWEEN BEAM SEATS.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT SHALL BE PLACED APPROXIMATELY 600 mm ABOVE NORMAL WATER ELEVATION. OPTIONAL KEYED CONSTRUCTION JOINT IN SHAFT SHALL BE USED IN ORDER THAT MAXIMUM HEIGHT OF POUR DOES NOT EXCEED 6000 mm.

KEYED CONSTRUCTION JOINTS SHALL BE FORMED BY BEVELED KEYWAY 100 mm DEEP x 1/3 THICKNESS OF SHAFT x 1000 mm. LESS THAN LENGTH OF SHAFT. EXPOSED EDGES OF CONSTRUCTION JOINT SHALL BE FLUSH AND NOT BEVELED.

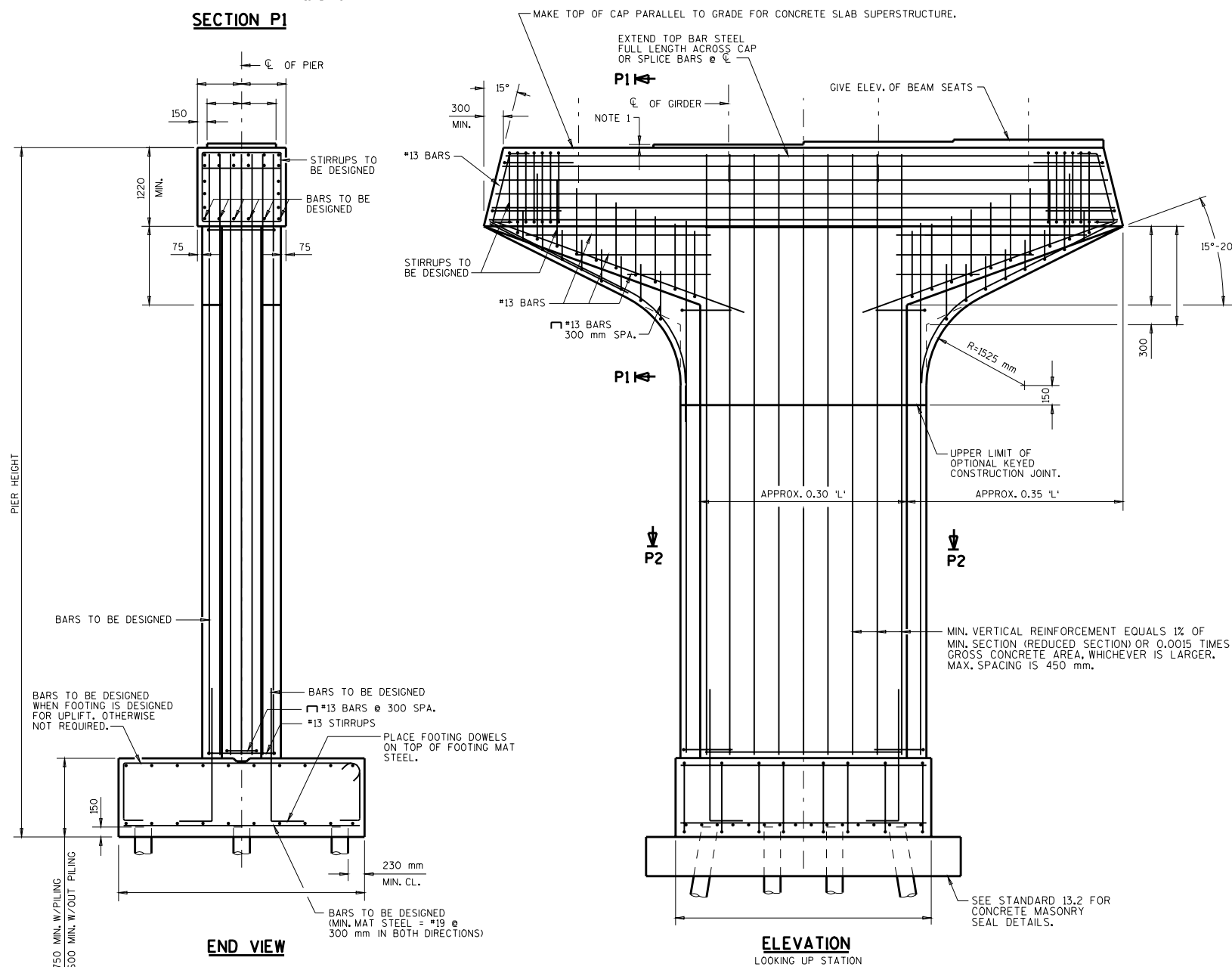
SEE BRIDGE MANUAL FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS THAT ARE 100 mm OR MORE ABOVE LOWEST BEAM SEAT.

THIS MAXIMUM SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA. VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS LESS THAN 0.01 TIMES GROSS CONCRETE AREA AND VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

FOR "HAMMERHEAD LENGTH" GREATER THAN 14000 mm CONSIDER A TWO SHAFT PIER FRAME RESEMBLING TWO HAMMERHEAD PIERS PLACED SIDE BY SIDE.

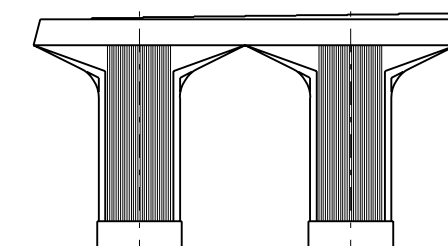
SEE STANDARD 13.1 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.

ALL DIMENSIONS ARE IN MILLIMETERS.

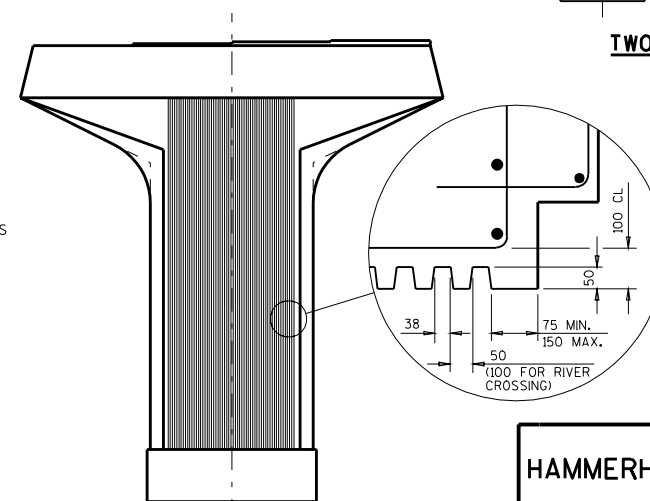


ELEVATION
LOOKING UP STATION

END VIEW



TWO SHAFT PIER



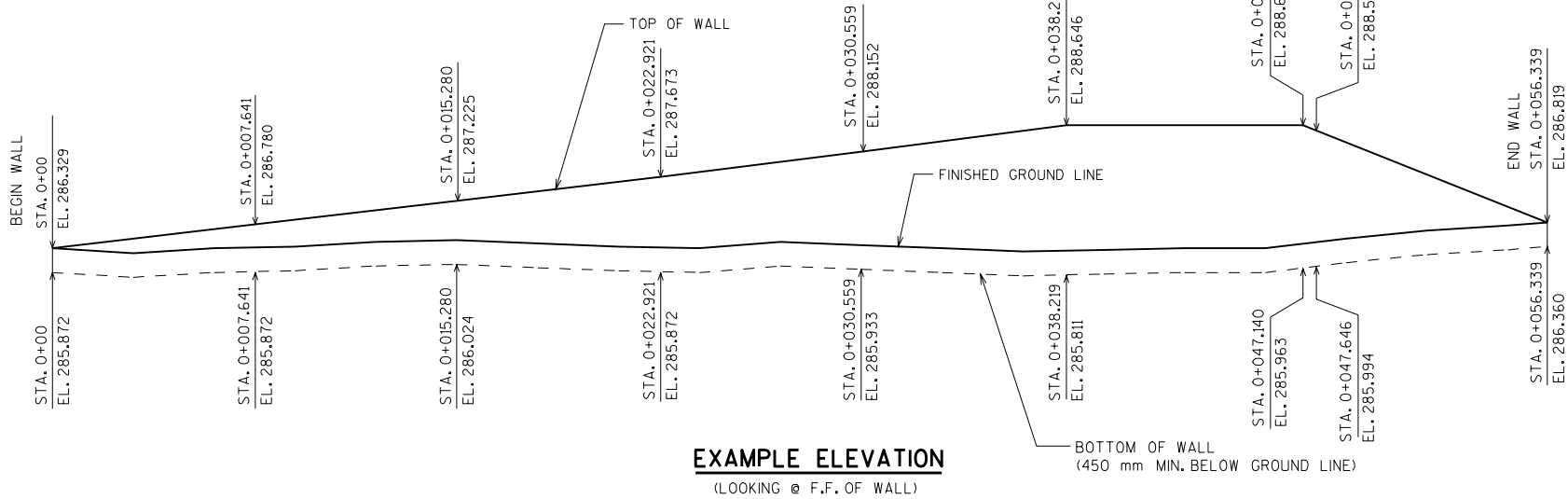
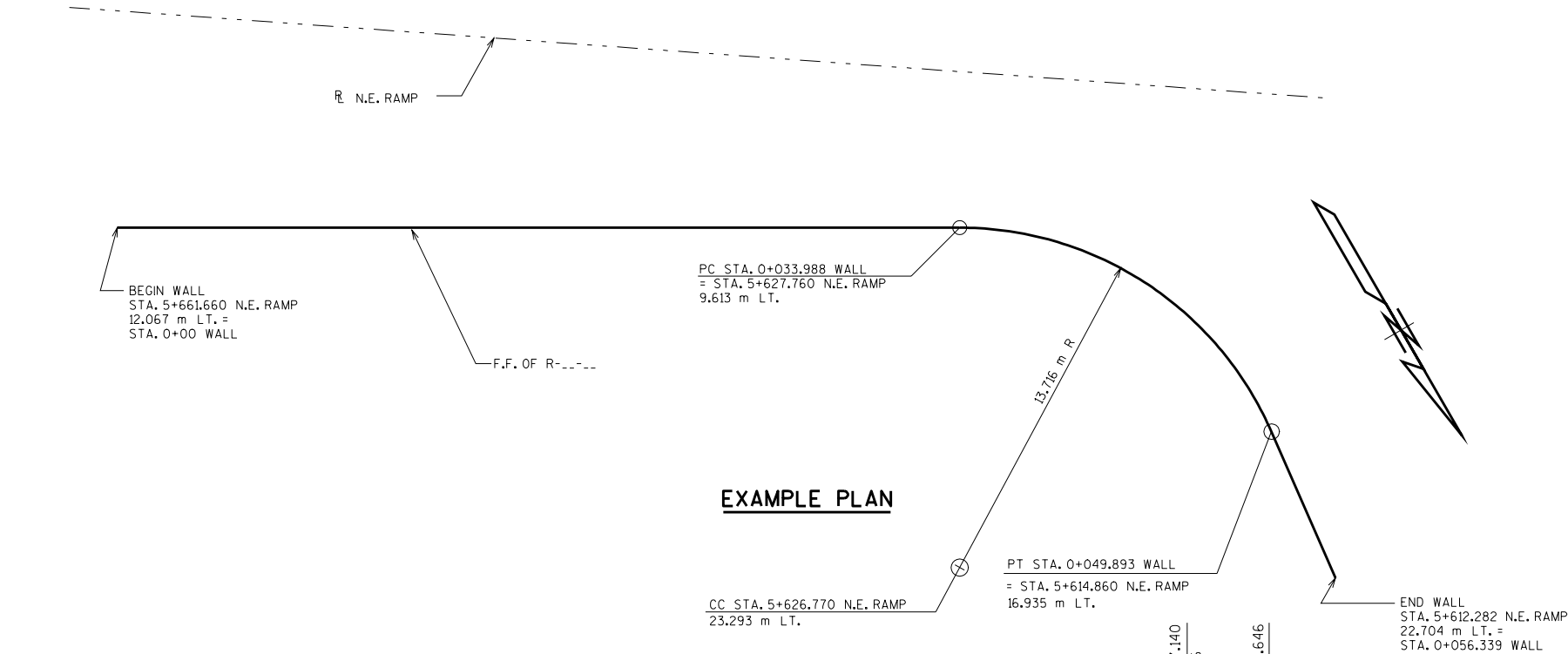
TEXTURING LIMITATIONS OF PIER WALL
(EACH FACE)

HAMMERHEAD PIER - TYPE 2

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/03



SAFETY FACTORS

MINIMUM DOT STANDARD	(INSERT WALL SYSTEM)
SLIDING (FS>1.5)	
OVERTURNING (FS>2.0)	
GLOBAL STABILITY (FS>1.3)	
ULTIMATE BEARING CAPACITY (FS>2) BASED ON WALL WIDTHS & IMBEDMENT DEPTHS SHOWN IN TABLE	

GEOMETRY TABLE

STATION	OFFSET TO F.F. WALL	COORDINATES	ELEV. A	ELEV. B

SOIL PARAMETERS

STRATUM LOCATIONS & SOIL DESCRIPTIONS	UNIT WEIGHT (kN/m ³)	FRICTION ANGLE (DEGREES)	COHESION (kPa)
EL. - EL. (SOIL TYPE)			
EL. - EL. (SOIL TYPE)			
EL. & BELOW (SOIL TYPE)			
RETAINED SOIL EL. - EL. *			

* DESIGN WALL FOR THESE VALUES

DESIGN DATA

THE CONTRACTOR SHALL PROVIDE COMPLETE DESIGN, PLANS, DETAILS, SPECIFICATIONS, AND SHOP DRAWINGS FOR THE RETAINING WALLS IN ACCORDANCE WITH THE SPECIAL PROVISIONS. THE RETAINING WALL MANUFACTURER SHALL PROVIDE TECHNICAL ASSISTANCE TO THE CONTRACTOR DURING CONSTRUCTION. THE COST OF FURNISHING THESE ITEMS SHALL BE INCLUDED IN THE BID ITEM "(INSERT WALL SYSTEM OR SYSTEMS)".

PLANS, ELEVATIONS AND DETAILS SHOWN ON THESE DRAWINGS ARE INTENDED TO INDICATE WALL LOCATIONS, LENGTHS, HEIGHTS, AND DETAILS COMMON TO THE WALL SYSTEM SELECTED. THE CONTRACTOR SHALL VERIFY THAT THE WALL SYSTEM SELECTED WILL CONFORM TO THE REQUIRED ALIGNMENTS AND DETAILS.

THE RETAINING WALL IS TO BE DESIGNED USING THE ELEVATIONS GIVEN ON THIS SHEET.

DESIGN FOR RETAINING WALL TO PROVIDE FOR FINISHED GRADE SLOPED BEHIND WALL AS SHOWN.

SEE SPECIAL PROVISIONS FOR AESTHETIC TREATMENT TO WALL.

DESIGN RETAINING WALL FOR A LIVE LOAD SURCHARGE OF (INSERT VALUE).

ALL DIMENSIONS ARE IN MILLIMETERS.

ALLOWABLE WALL SYSTEMS

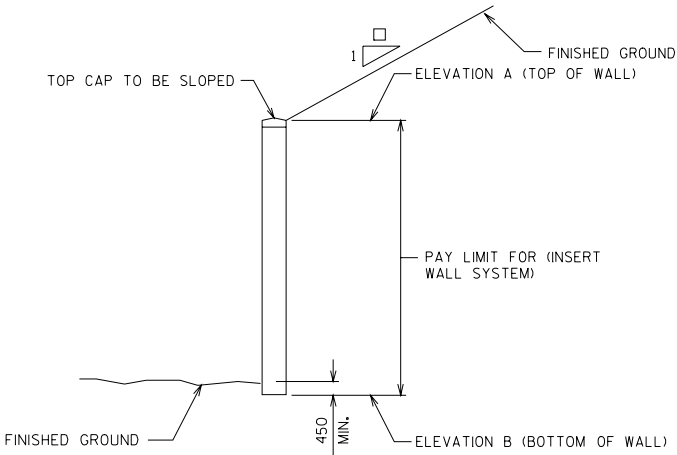
-
-

TOTAL ESTIMATED QUANTITIES

(INSERT WALL SYSTEM) ----- m²

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.



TYP. CROSS SECT. OF RETAINING WALL

BRIDGE OFFICE CONTACT:

PROPRIETARY RETAINING WALLS (GENERAL PLAN)

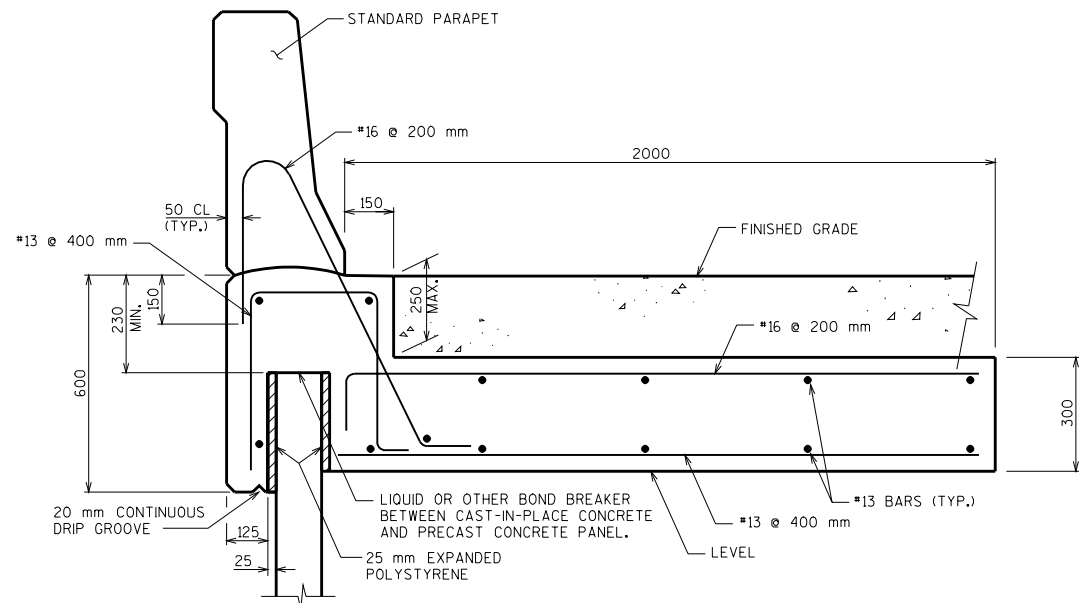
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1-02

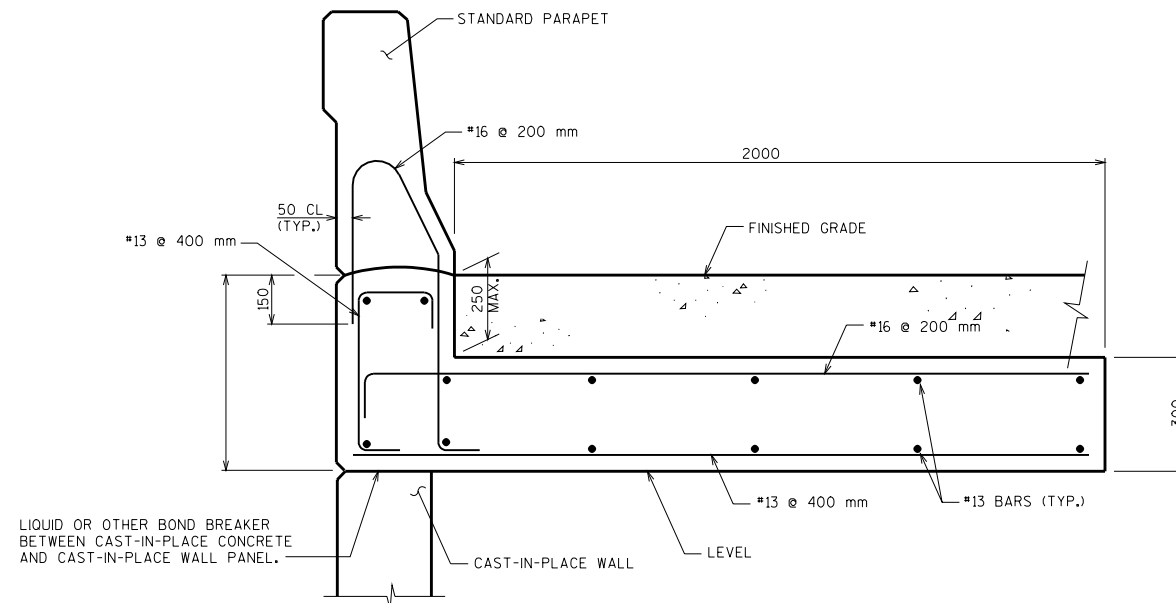
LIST OF DRAWINGS

- (INSERT WALL SYSTEM)
- SUBSURFACE EXPLORATION



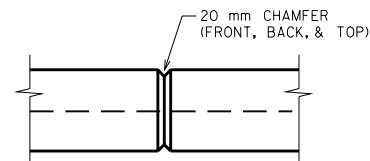
CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR PRECAST WALL PANELS

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND FOOTING MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT, LAP LONGITUDINAL BARS A MINIMUM OF 535 mm. DEFINE CONSTRUCTION JOINT WITH A 20 mm "V" GROOVE.



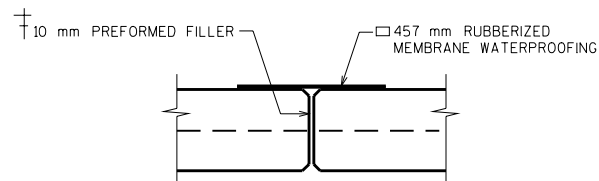
CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR CAST-IN-PLACE WALL PANELS

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND FOOTING MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT, LAP LONGITUDINAL BARS A MINIMUM OF 535 mm. DEFINE CONSTRUCTION JOINT WITH A 20 mm "V" GROOVE.



COPING CONTRACTION JOINT

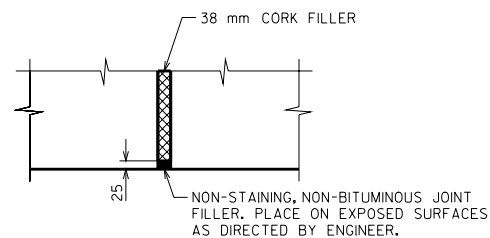
DO NOT RUN BAR STEEL THRU JOINT.
MAX. SPACING OF JOINT = 4 m



COPING EXPANSION JOINT

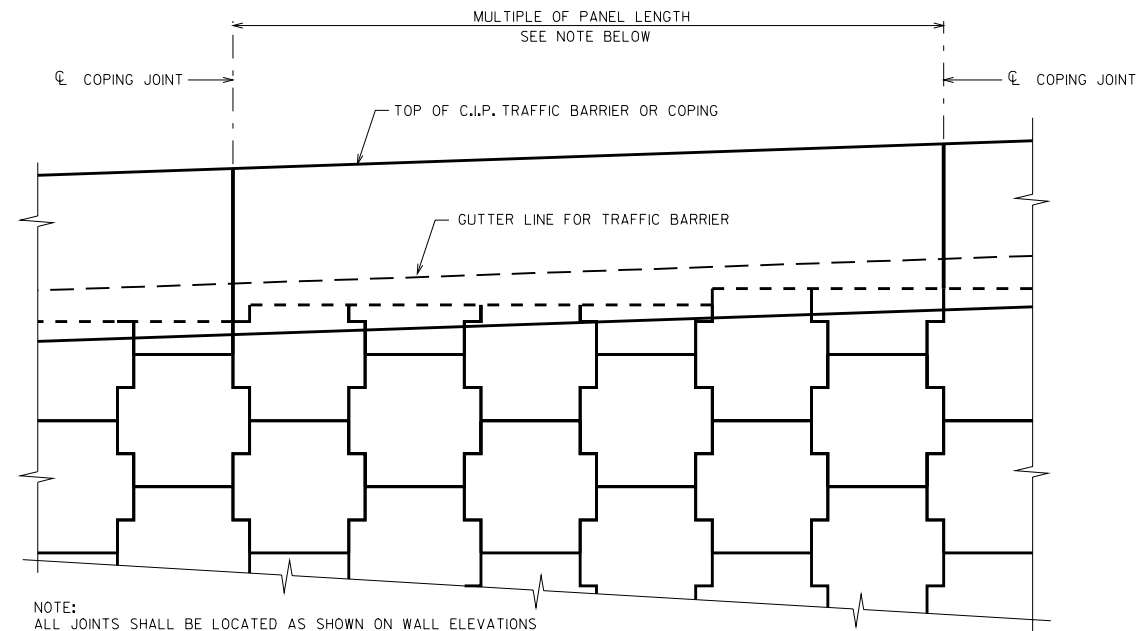
DO NOT RUN BAR STEEL THRU JOINT.
MAX. SPACING OF JOINT = 15 m
SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (25 mm DEEP AND HOLD 3 mm BELOW SURFACE OF CONC.)

MEMBRANE WATERPROOFING TO EXTEND FROM TOP OF COPING TO 150 mm BELOW TOP OF PANELS.



CONCRETE TRAFFIC BARRIER EXPANSION JOINT DETAIL

EXPANSION JOINT SPACING NOT TO EXCEED 8000 mm. DO NOT RUN BAR STEEL THRU JOINT. LOCATE OVER WALL JOINT.



NOTE:
ALL JOINTS SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS AND MUST COINCIDE WITH PANEL JOINT ON FRONT FACE WHERE BOTTOM OF LIP INTERSECTS WITH PANEL JOINT.

C.I.P. TRAFFIC BARRIER OR COPING PARTIAL ELEVATION

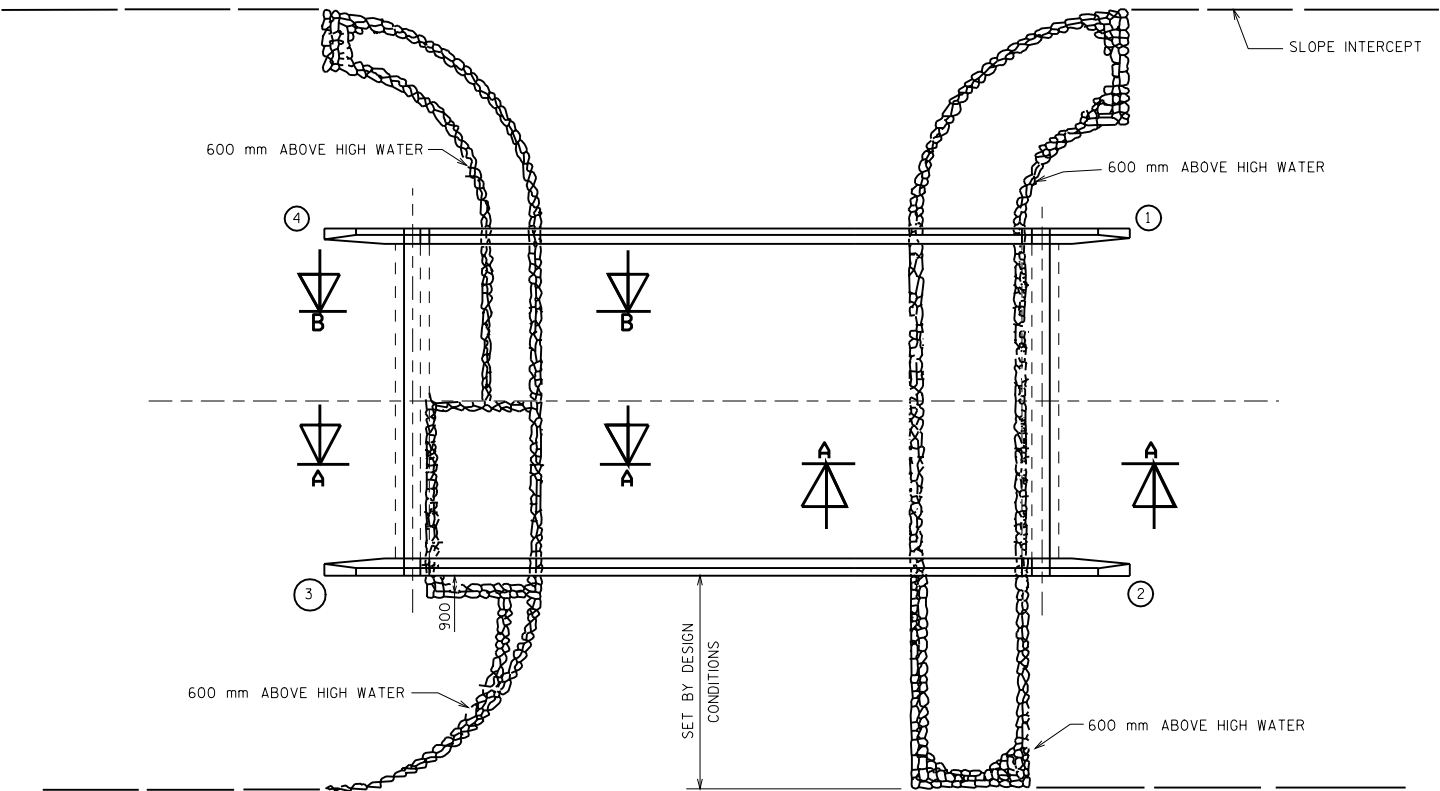
MSE RETAINING WALL DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1-02

ALL DIMENSIONS ARE IN MILLIMETERS.



ALTERNATE ①

NORMAL CONDITION FOR EMBANKMENT FILLS

ALTERNATE ②

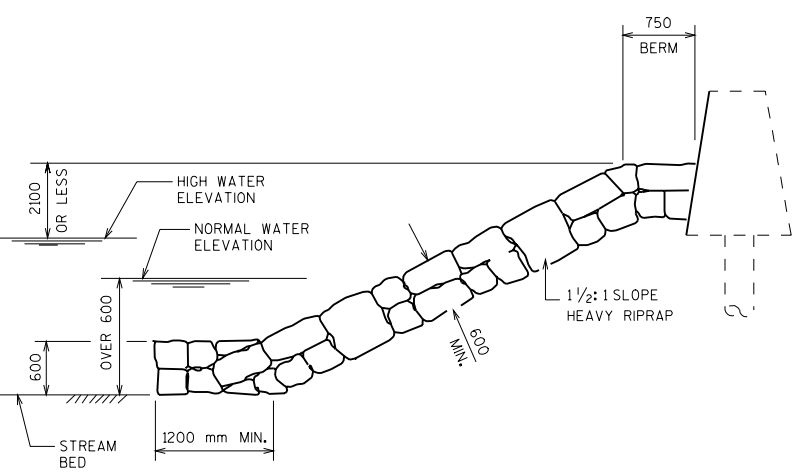
FOR CHANNEL CHANGE CONDITION

ALTERNATE ③

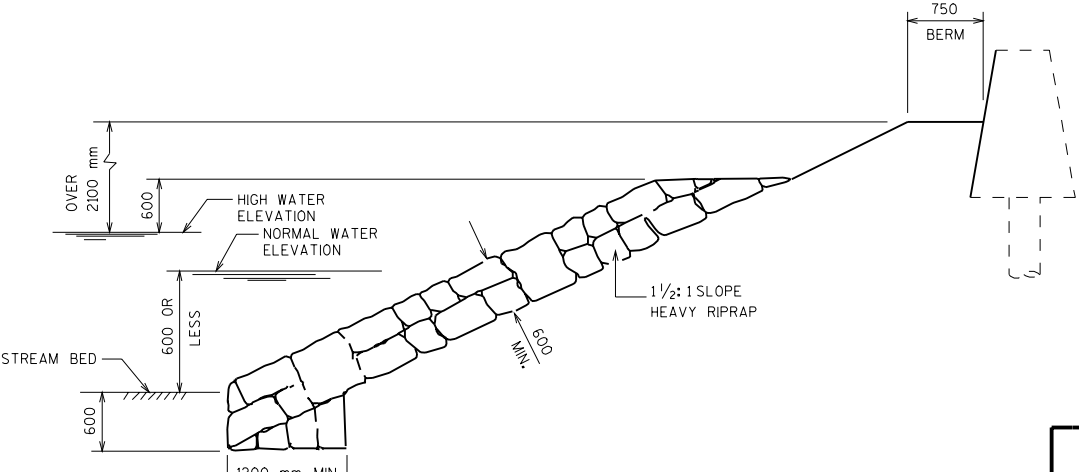
USE WHERE BERM ELEVATION IS LESS THAN 2100 mm ABOVE HIGH WATER

ALTERNATE ④

USE WHERE BERM ELEVATION IS OVER 2100 mm ABOVE HIGH WATER



SECTION A-A



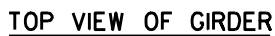
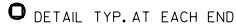
SECTION B-B

**PLACEMENT OF HEAVY RIPRAP
AT RIVER CROSSINGS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99



SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

THE MAX. NUMBER OF DRAPED 13 mm ϕ STRANDS IS 12 AND FOR 15 mm ϕ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 42 MPa TO A MAX. OF 56 MPa. USE ONLY 13 mm ϕ STRAND FOR THE DRAPED PATTERN. USE 15 mm ϕ FOR THE STRAIGHT PATTERN.

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING
DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS
SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 50 mm OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #13 STIRRUPS IS FOR GRADE 420 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #13 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

1. USE ASTM A706M, GRADE 420 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
2. USE ASTM A615M, GRADE 300 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE
SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON
APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION. (608)266-8494.

WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF
ASTM A497.

ALL DIMENSIONS ARE IN MILLIMETERS.



VALUES SHOWN ARE FOR STIRRUPS FOR 10700 mm SPANS AND A 4000 mm GIRDER
SPACING, MS18 LOADING. DESIGN STIRRUPS FOR ALL OTHER CASES, USE #13
BARS AT 530 mm AS MINIMUM STIRRUP AREA.

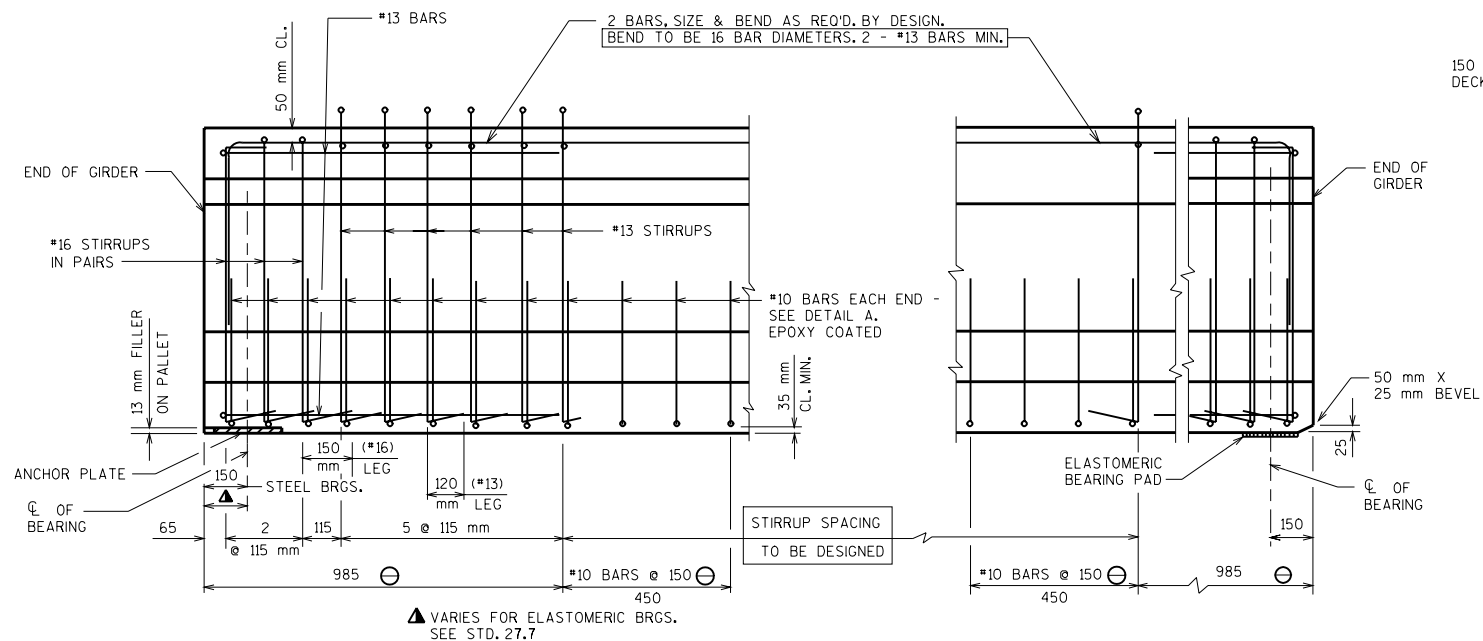


710 mm PRETENSIONED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED:

DATE:
1/03

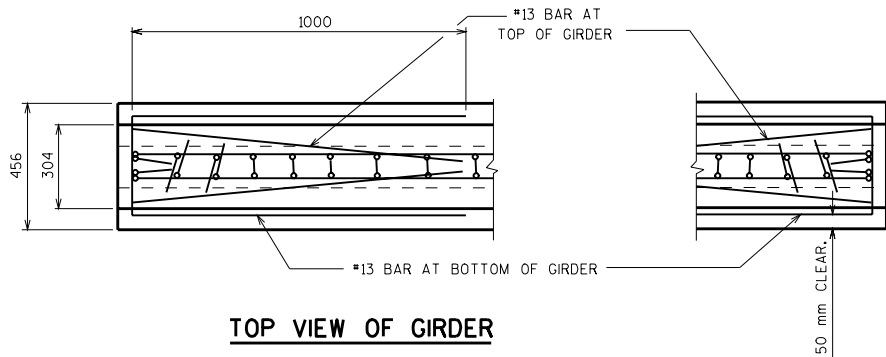


SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

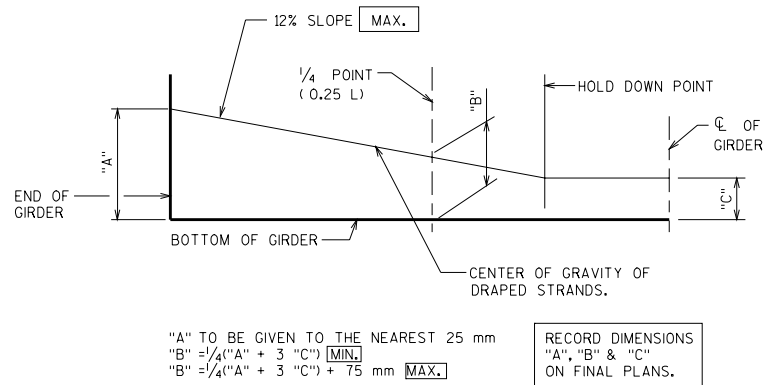
SUPPORT WITH 13 mm ELASTOMERIC BRG. PAD

SIDE VIEW OF GIRDER

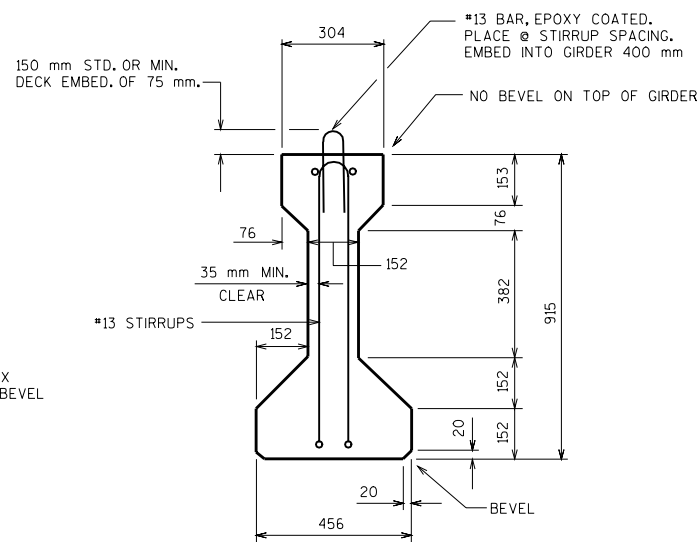
DETAIL TYPICAL AT EACH END.



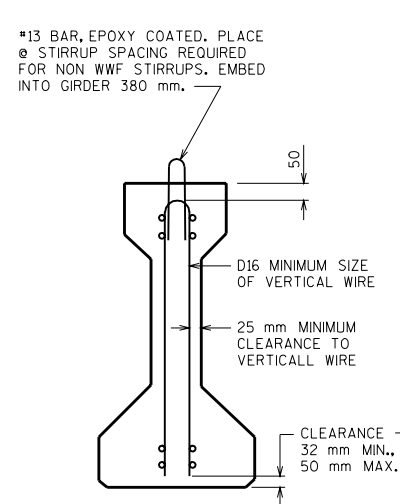
TOP VIEW OF GIRDER



LOCATION OF DRAPED STRANDS



SECTION THRU GIRDER



SECTION THRU GIRDER
SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

DESIGNER NOTES

THE MAX. NUMBER OF DRAPED 13 mm ϕ STRANDS IS 12 AND FOR 15 mm ϕ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 42 MPa TO A MAX. OF 56 MPa. USE ONLY 13 mm ϕ STRAND FOR THE DRAPED PATTERN. USE 15 mm ϕ FOR THE STRAIGHT PATTERN.

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 50 mm OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #13 STIRRUPS IS FOR GRADE 420 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #13 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

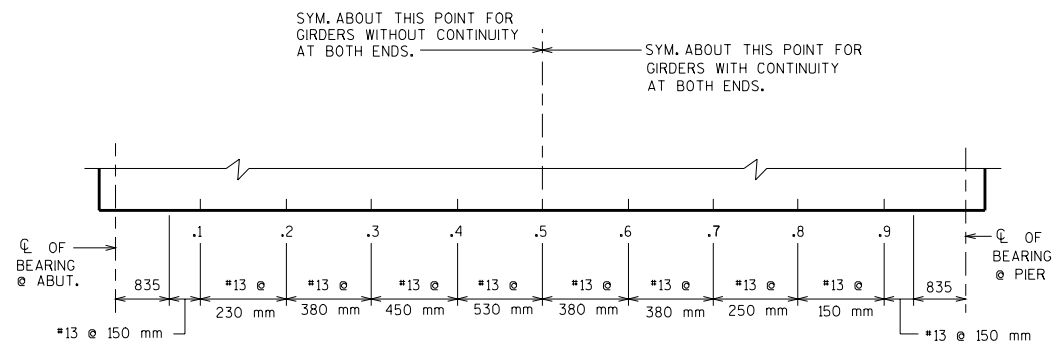
1. USE ASTM A706M, GRADE 420 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.

2. USE ASTM A615M, GRADE 300 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION. (608)266-8494.

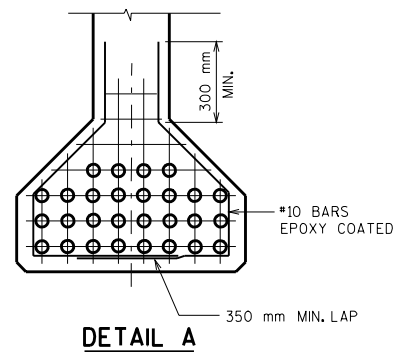
WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A497.

ALL DIMENSIONS ARE IN MILLIMETERS.



MAXIMUM STIRRUP NUMBER REQUIREMENTS

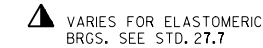
VALUES SHOWN ARE FOR STIRRUPS FOR 12200 mm SPANS AND 3750 mm GIRDER SPACING. DESIGN STIRRUPS FOR ALL OTHER CASES. USE #13 BARS AT 530 mm AS MINIMUM STIRRUP AREA. MS18 LOADING.



915 mm PRETENSIONED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

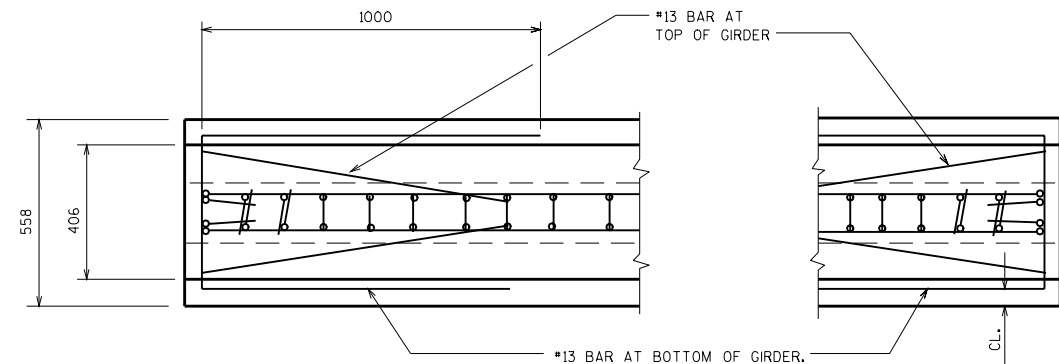
APPROVED: _____ DATE: 1/03



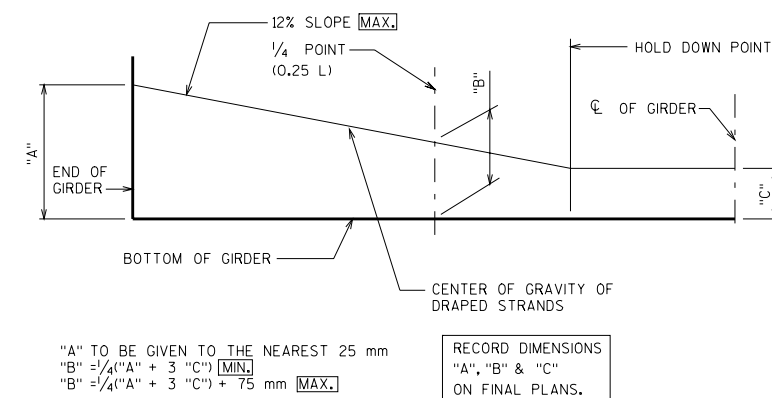
SUPPORT WITH STEEL
OR ELASTOMERIC BRGS.



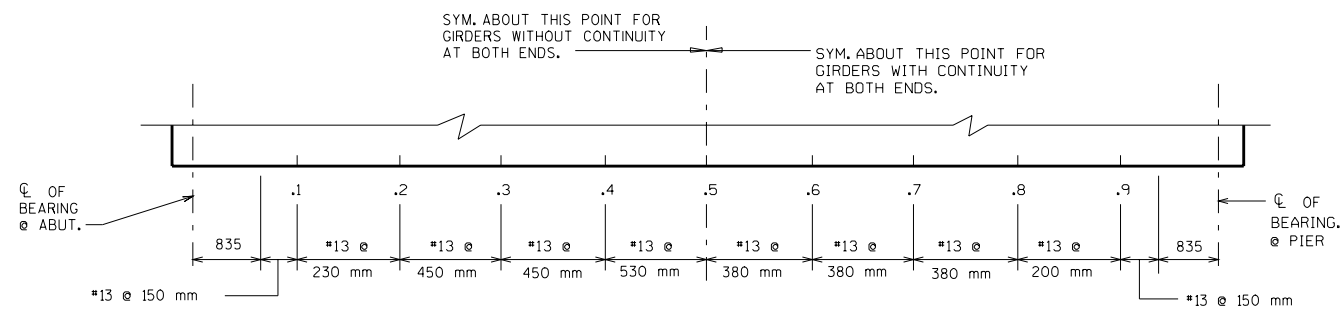
SIDE VIEW OF GIRDER



TOP VIEW OF GIRDER

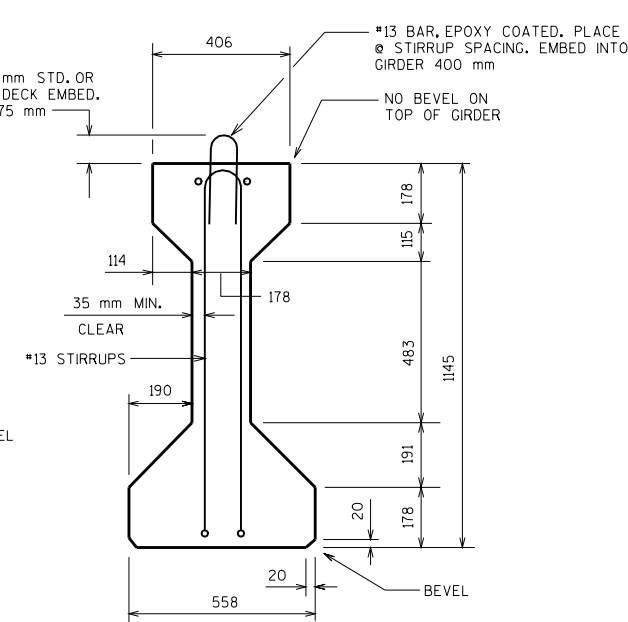


LOCATION OF DRAPED STRANDS

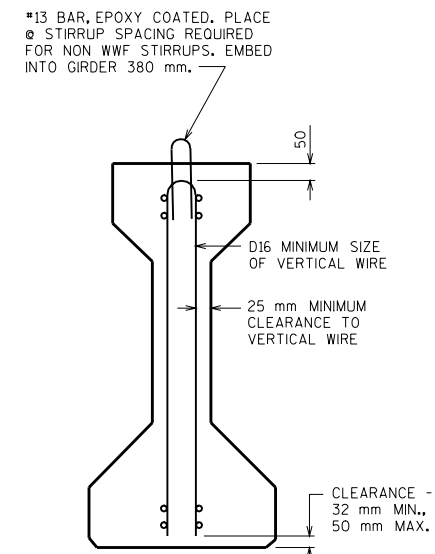


MAXIMUM STIRRUP NUMBER REQUIREMENTS

VALUES SHOWN ARE FOR STIRRUPS FOR 19800 mm SPANS AND 3900 mm GIRDER
SPACING, MS18 LOADING. DESIGN STIRRUPS FOR OTHER CASES. USE #13 BARS
AT 530 mm AS MINIMUM STIRRUP AREA.



SECTION THRU GIRDER



SECTION THRU GIRDER
SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

DESIGNER NOTES

THE MAX. NUMBER OF DRAPED 13 mm ϕ STRANDS IS 12 AND FOR 15 mm ϕ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 42 MPa TO A MAX. OF 56 MPa. USE ONLY 13 mm ϕ STRAND FOR THE DRAPED PATTERN. USE 15 mm ϕ FOR THE STRAIGHT PATTERN.

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING
DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS
SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 50 mm OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #13 STIRRUPS IS FOR GRADE 420 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #13 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

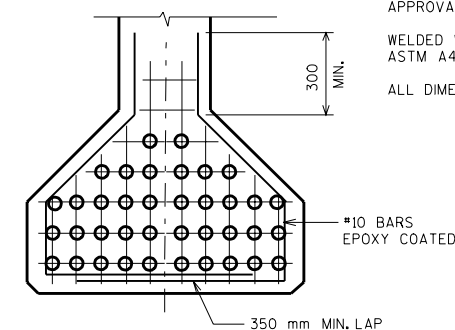
1. USE ASTM A706M, GRADE 420 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.

2. USE ASTM A615M, GRADE 300 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION. (608)266-8494.

WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF
ASTM A497.

ALL DIMENSIONS ARE IN MILLIMETERS.



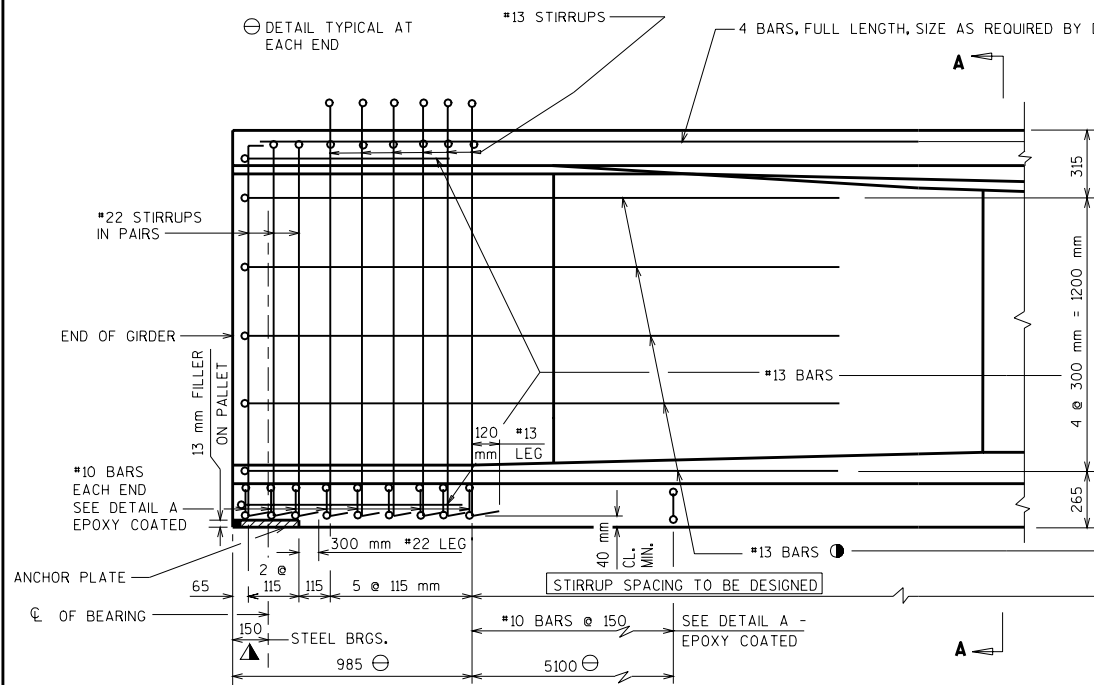
DETAIL A

1145 mm PRETENSIONED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

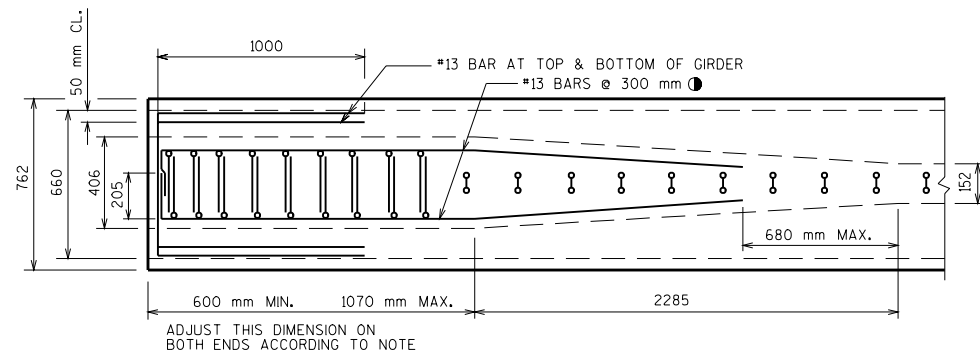
DATE:	1/03
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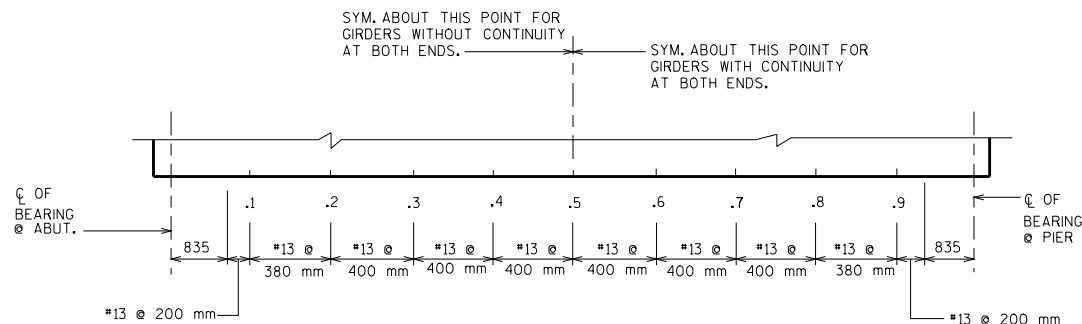
- ▲ VARIES FOR ELASTOMERIC BRGS. SEE STD. 27.7
- INCREASE THE SIZE OF THESE BARS IF REQUIRED BY AASHTO LRFD 5.8.3.5

SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SIDE VIEW OF GIRDER

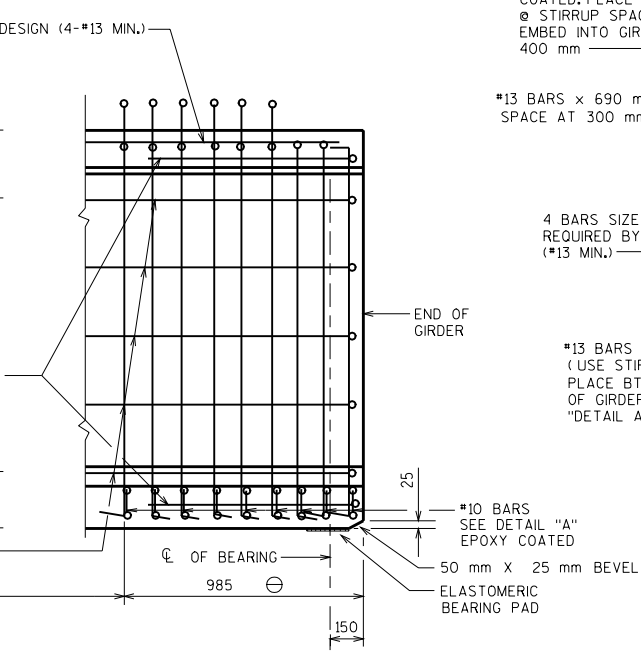


TOP VIEW OF GIRDER

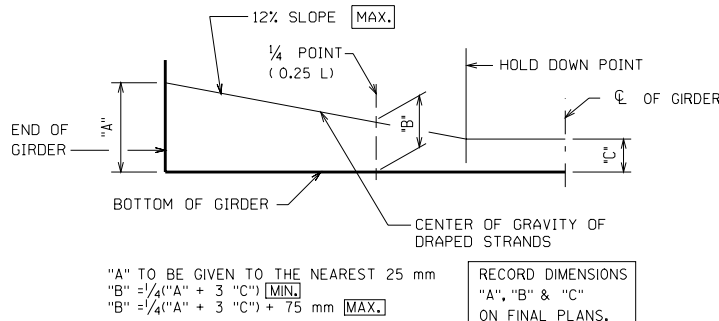


MAXIMUM STIRRUP NUMBER REQUIREMENTS

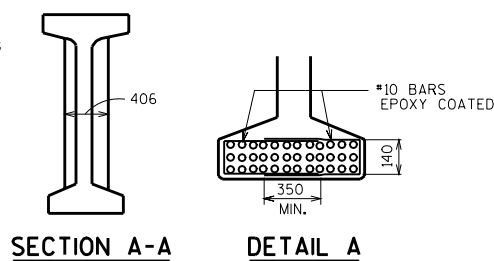
VALUES SHOWN ARE FOR STIRRUPS FOR 32000 mm SPANS AND 3500 mm GIRDER SPACING, MS18 LOADING. DESIGN STIRRUPS FOR ALL OTHER CASES. USE #13 BARS AT 400 mm AS MINIMUM STIRRUP AREA.



SUPPORT WITH 13 mm ELASTOMERIC BEARING PAD

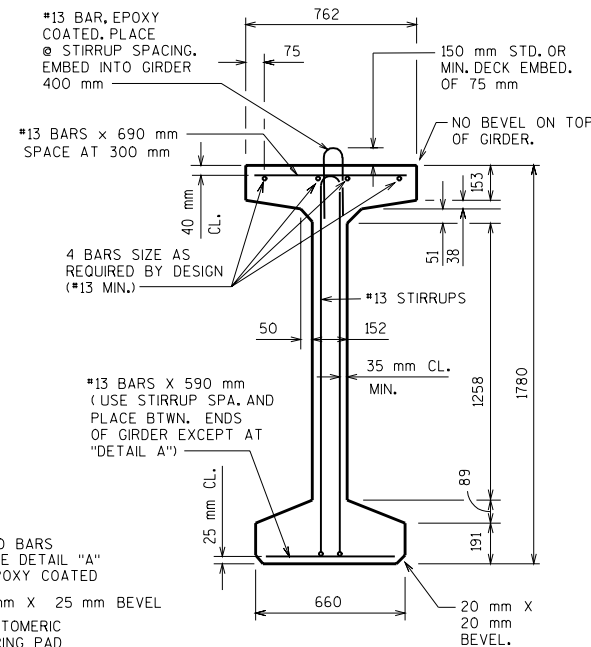


LOCATION OF DRAPED STRANDS

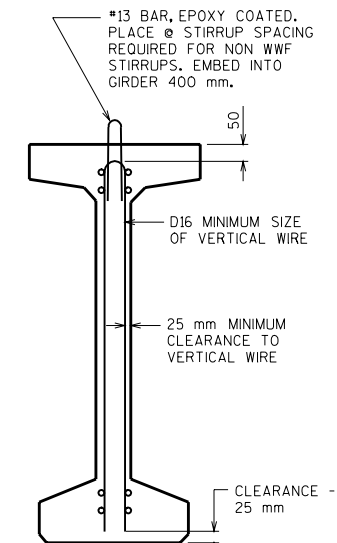


SECTION A-A

DETAIL A



SECTION THRU GIRDER



SECTION THRU GIRDER SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. [THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.]

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 50 mm OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #13 STIRRUPS IS FOR GRADE 420 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #13 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

1. USE ASTM A706M, GRADE 420 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
2. USE ASTM A615M, GRADE 300 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION. (608)266-8494

WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A497.

IF THE CONTRACTOR USES THE BOTTOM FLANGE TO SUPPORT CONSTRUCTION FORMS, THE CONTRACTOR SHALL SUBMIT FALSEWORK PLANS FOR APPROVAL BY THE STRUCTURES DESIGN SECTION.

ALL DIMENSIONS ARE IN MILLIMETERS.

DESIGNER NOTES

ON MULTIPLE SPAN STRUCTURES SET THE END BLOCK LENGTHS OF GIRDERS RESTING ON THE SAME PIER TO ± 50 mm. ON SIMPLE SPANS SET THE END BLOCK LENGTH ON BOTH GIRDER ENDS TO ± 50 mm.

THE MAX. NUMBER OF DRAPED 13 mm ϕ STRANDS IS 12 AND FOR 15 mm ϕ STRANDS THE MAX. IS 8.

GIRDER LENGTHS IN EXCESS OF 43 METERS MAY BE CONTROLLED BY TRANSPORTATION LIMITATIONS AND REQUIRE APPROVAL BY THE PRESTRESS GIRDER MANUFACTURERS.

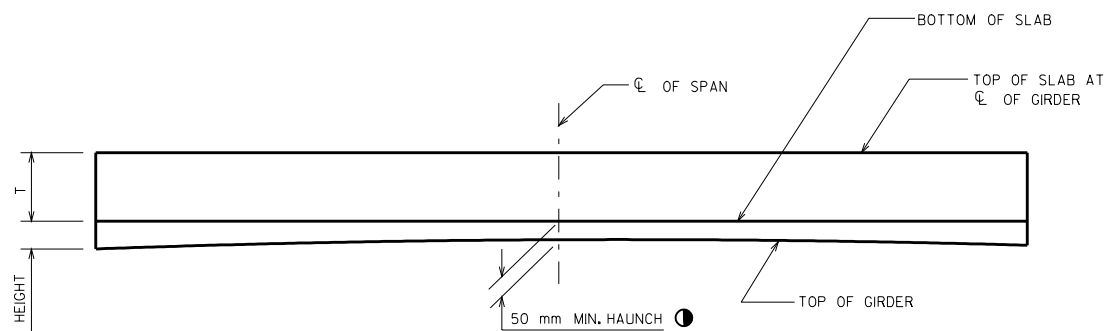
SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 42 MPa TO A MAX. OF 56 MPa. USE 15 mm ϕ STRAND FOR ALL PATTERNS.

1780 mm PRETENSIONED GIRDER DETAILS

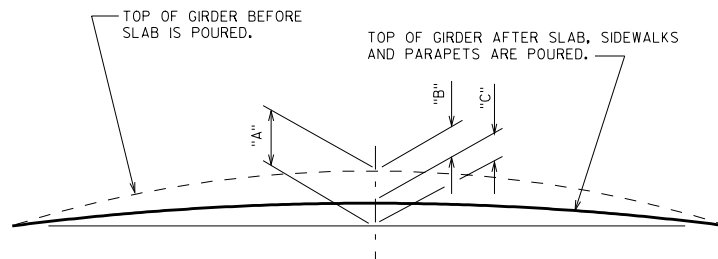
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/03



ELEVATION



CAMBER & DEFLECTION DIAGRAM

- * "A" = PRESTRESS CAMBER
- * "B" = DEAD LOAD DEFLECTION
- * "C" = RESIDUAL CAMBER
- * ROUND OFF TO NEAREST 5 mm

DESIGNER NOTES

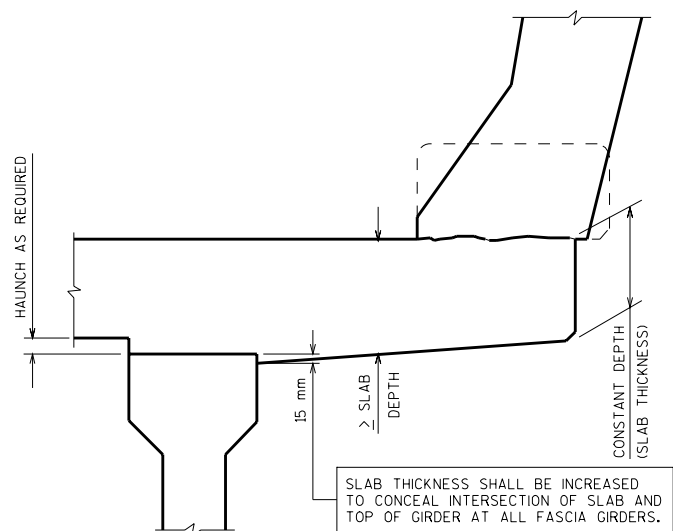
- PRESENT PRACTICE IS TO USE A MINIMUM "HAUNCH HEIGHT" OF 50 mm FOR DESIGN CALCULATIONS AND AN AVERAGE "HAUNCH HEIGHT" OF 60 mm FOR COMPUTING THE HAUNCH CONCRETE QUANTITY.

THE ACTUAL HAUNCH HEIGHTS UTILIZED SHALL BE BASED ON FIELD ELEVATIONS & DEAD LOAD DEFLECTION DATA. "PRESTRESS CAMBER" & "RESIDUAL CAMBER", WHICH ARE TIME DEPENDENT VARIABLES, SHALL NOT BE SHOWN ON THE PLANS. DEAD LOAD DEFLECTION AT THE 1/4 POINTS SHALL BE SHOWN ON THE PLANS.

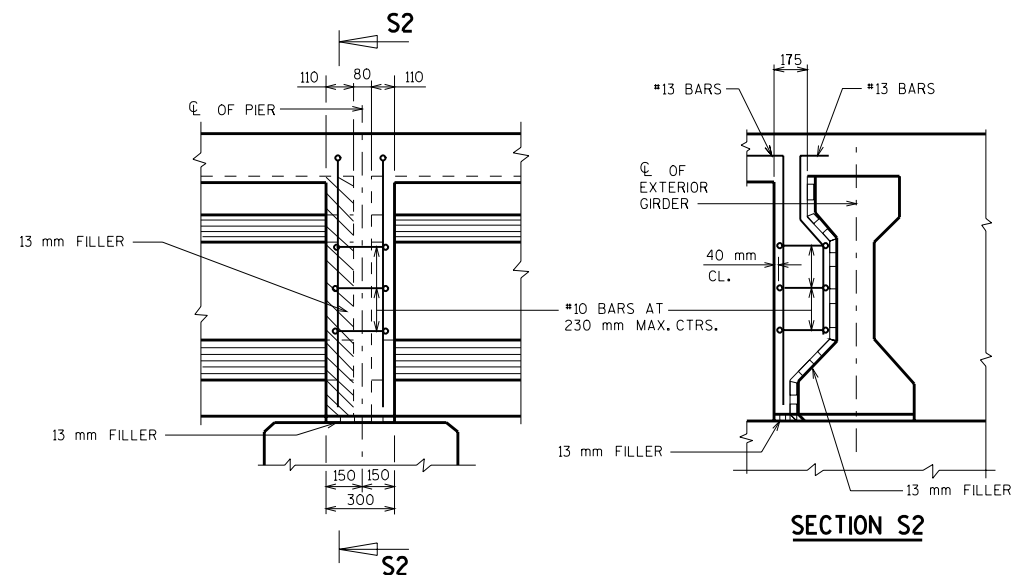
"INTERMEDIATE CONCRETE DIAPHRAGMS" SHALL BE USED ONLY WHEN THE USE OF STEEL DIAPHRAGMS IS NOT FEASIBLE BECAUSE OF UTILITIES OR FOR OTHER SPECIAL SITUATIONS. ONLY ONE TYPE OF INTERMEDIATE DIAPHRAGM SHALL BE SHOWN ON THE PLANS. THE USE OF BOTH INTERMEDIATE CONCRETE & STEEL DIAPHRAGMS ON THE SAME BRIDGE IS NOT ALLOWED.

THE USE OF PILASTERS SHALL BE OPTIONAL.

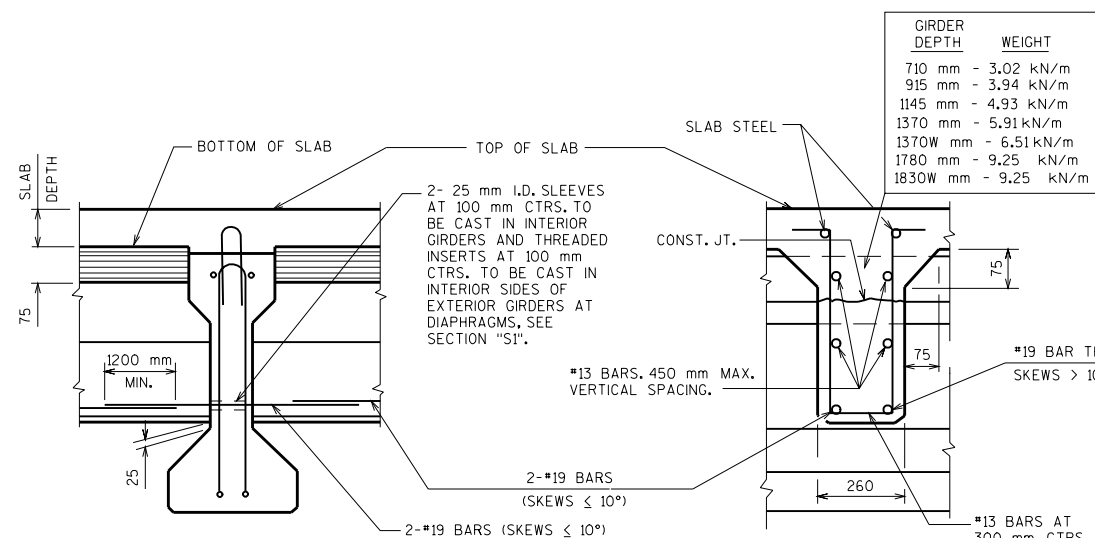
ALL DIMENSIONS ARE IN MILLIMETERS.



SECTION AT EXTERIOR GIRDER



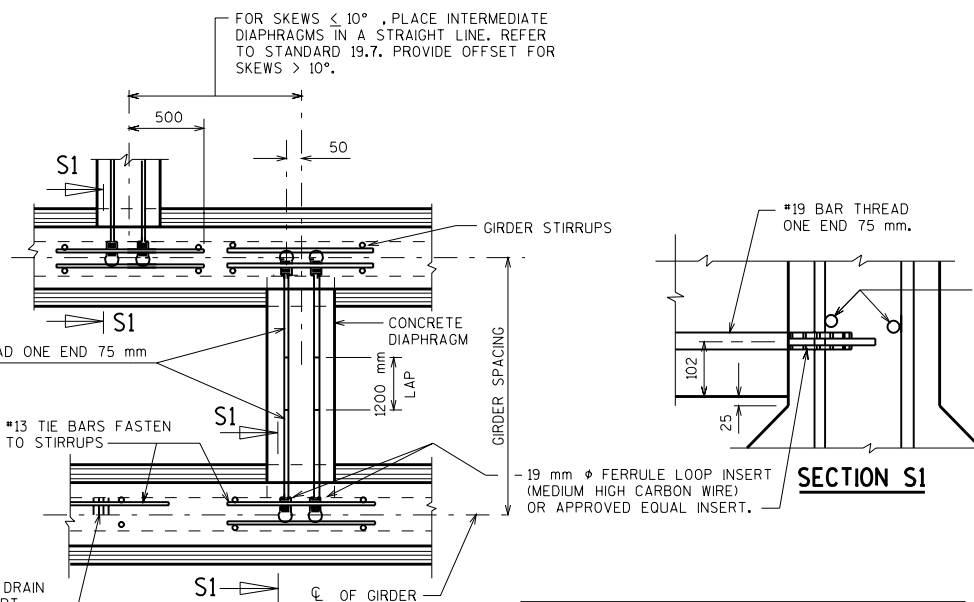
PILASTER DETAIL AT PIERS



ELEVATION OF DIAPHRAGM

INTERMEDIATE CONCRETE DIAPHRAGM DETAILS

SECTION THRU DIAPHRAGM



TOP VIEW OF DIAPHRAGM

SKEW ANGLES > 10°

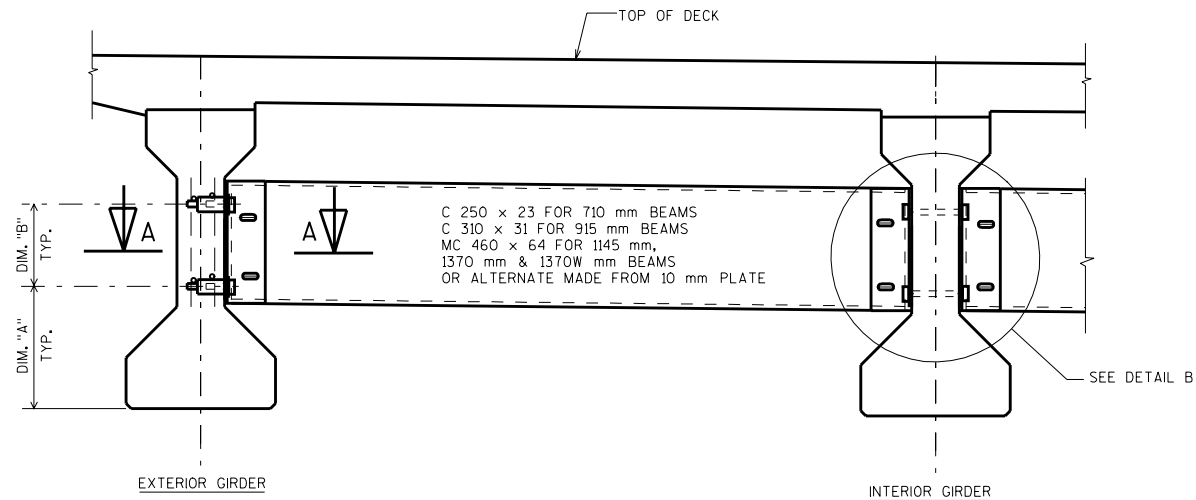
DIAPHRAGM SPACING: FOR SPANS ≤ 24000 mm PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 24000 mm PLACE AT 1/3 AND 2/3 POINTS.

SECTION S1

PRETENSIONED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

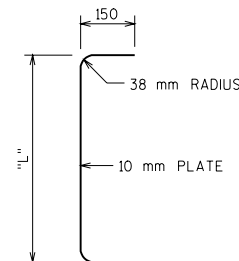
APPROVED: _____ DATE: 1/03



PART TRANSVERSE SECTION AT DIAPHRAGM

TABLE

GIRDER HEIGHT (mm)	DIM. "A" (mm)	DIM. "B" (mm)	DIM. "L" (mm)	DIM. * "X" (mm)
710	330	145	240	58
915	380	250	345	85
1145	445	350	445	59
1370	505	450	545	109
1370W	535	450	545	109



SECTION THRU ALTERNATE DIAPHRAGM

*DIM "X" = 65 mm FOR ALTERNATE PLATE DIAPHRAGM

NOTES

ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STEEL DIAPHRAGM", STRUCTURE, EACH.

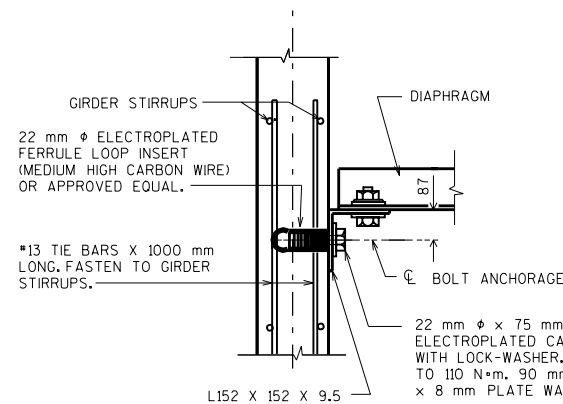
EACH DIAPHRAGM BETWEEN GIRDERS SHALL CONSTITUTE ONE UNIT.

ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709M GRADE 250. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325M TYPE 1.

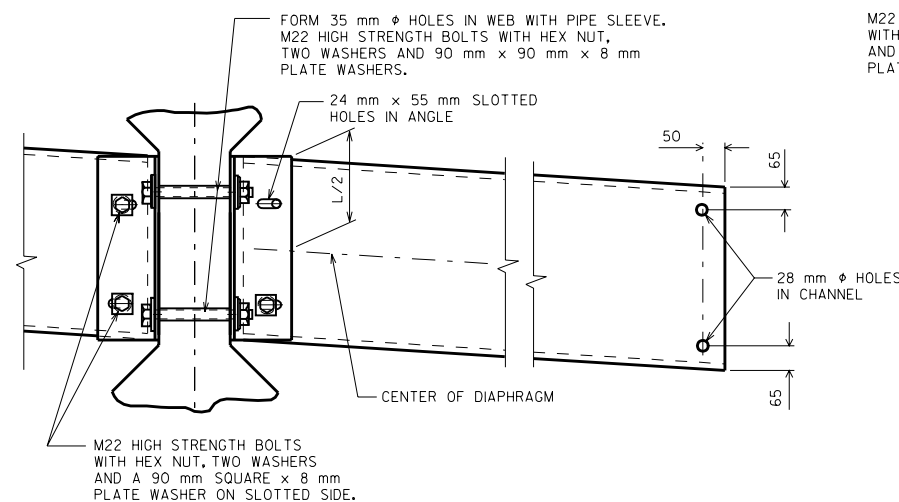
ALL DIAPHRAGM STRUCTURAL STEEL SHOWN SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563M AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S1 OF ASTM A563, LUBRICANT AND TEST FOR COATED NUTS.

FOR SPANS EQUAL TO OR LESS THAN 24000 mm, PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 24000 mm, PLACE AT 1/3 AND 2/3 POINTS.

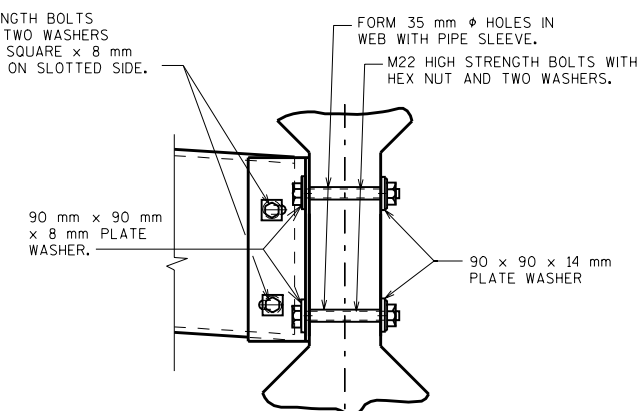
ALL DIMENSIONS ARE IN MILLIMETERS.



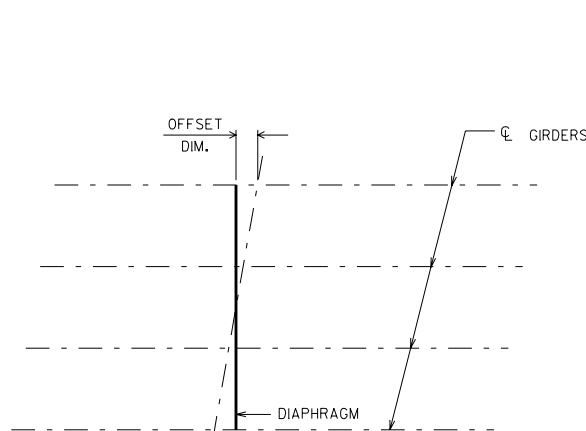
SECT. A-A
(FOR EXTERIOR ATTACHMENT)



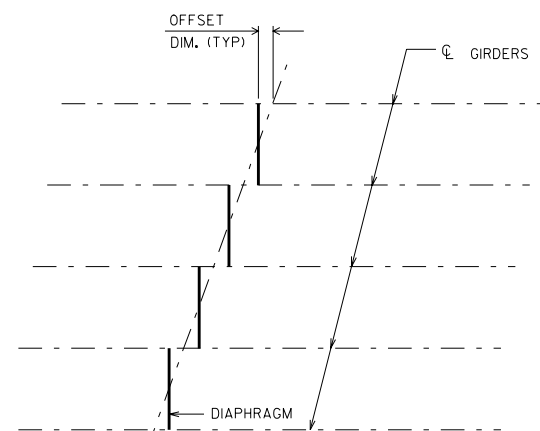
DETAIL B
(FOR CONTINUOUS LINE OF DIAPHRAGMS)



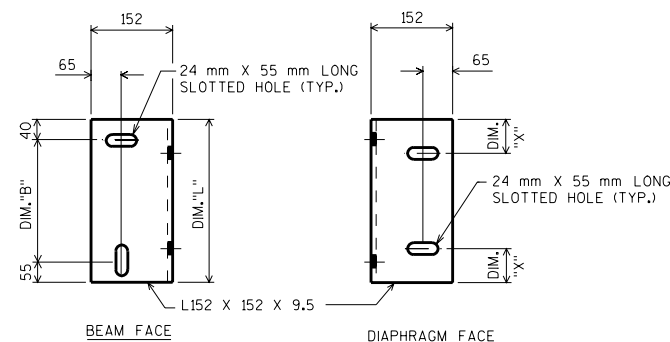
SECTION AT INTERIOR GIRDERS THRU DIAPHRAGM FOR SKEW ANGLES > 10°



PLAN FOR SKEW ANGLES ≤ 10°

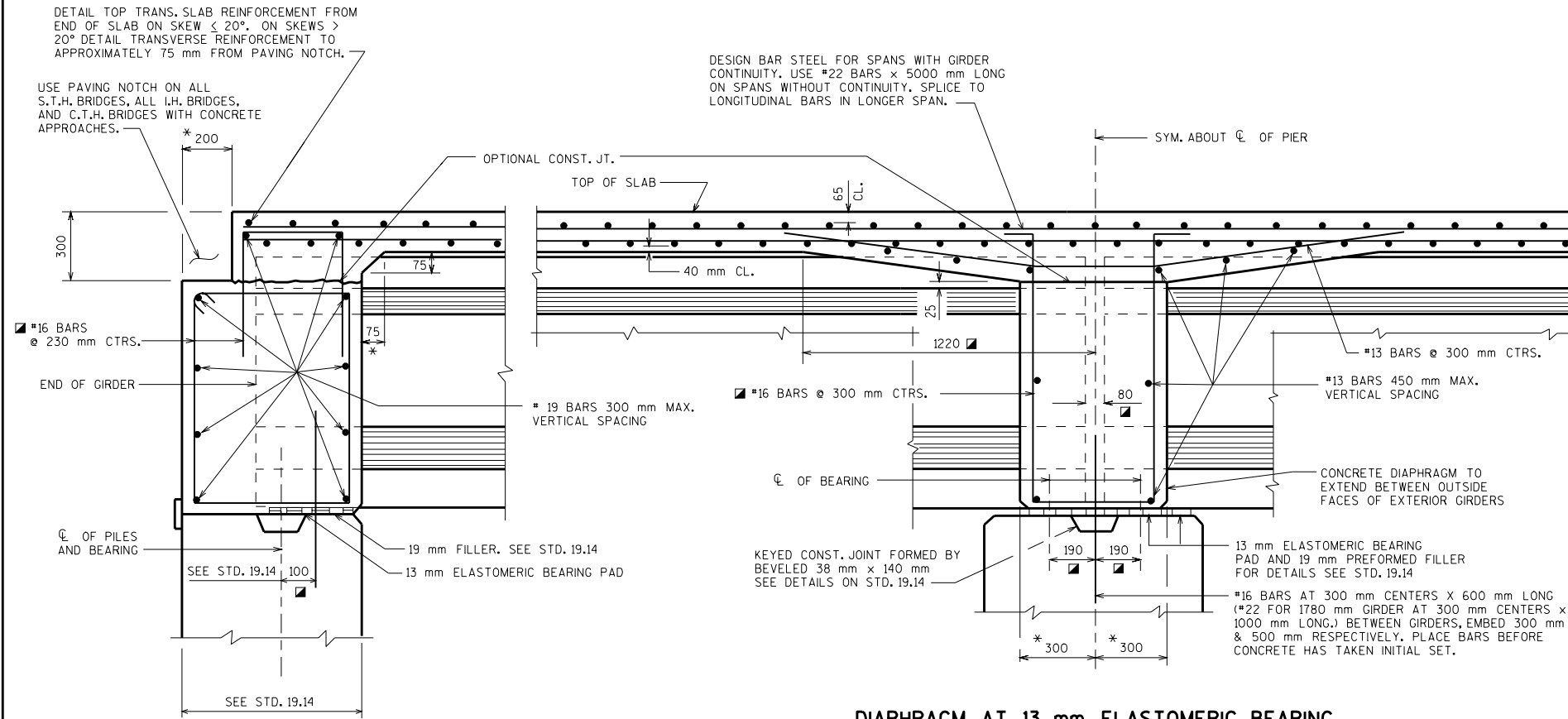


PLAN FOR SKEW ANGLES > 10°



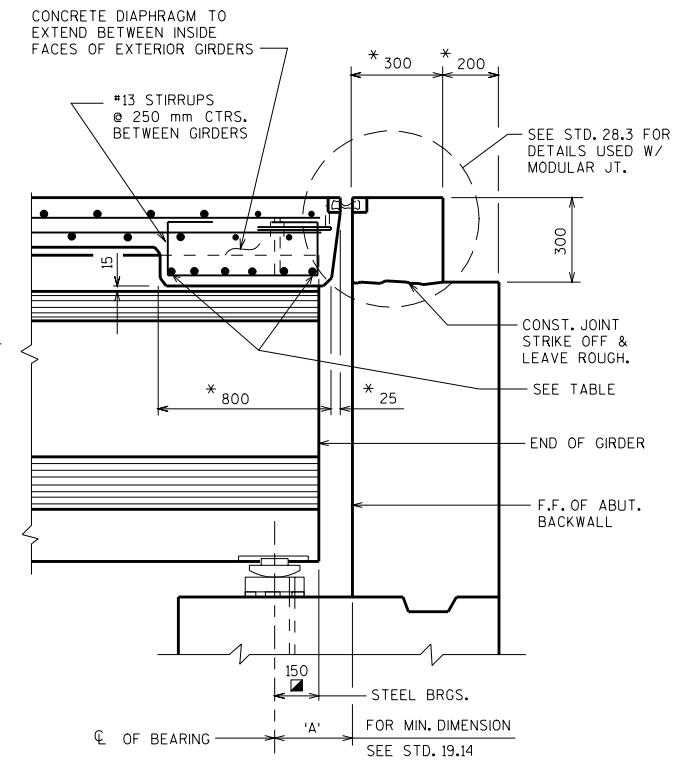
DIAPHRAGM SUPPORT

INTERM. STEEL DIAPHS. FOR 710, 915, 1145, 1370, & 1370W mm PRESTRESSED GIRDERS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 6/00



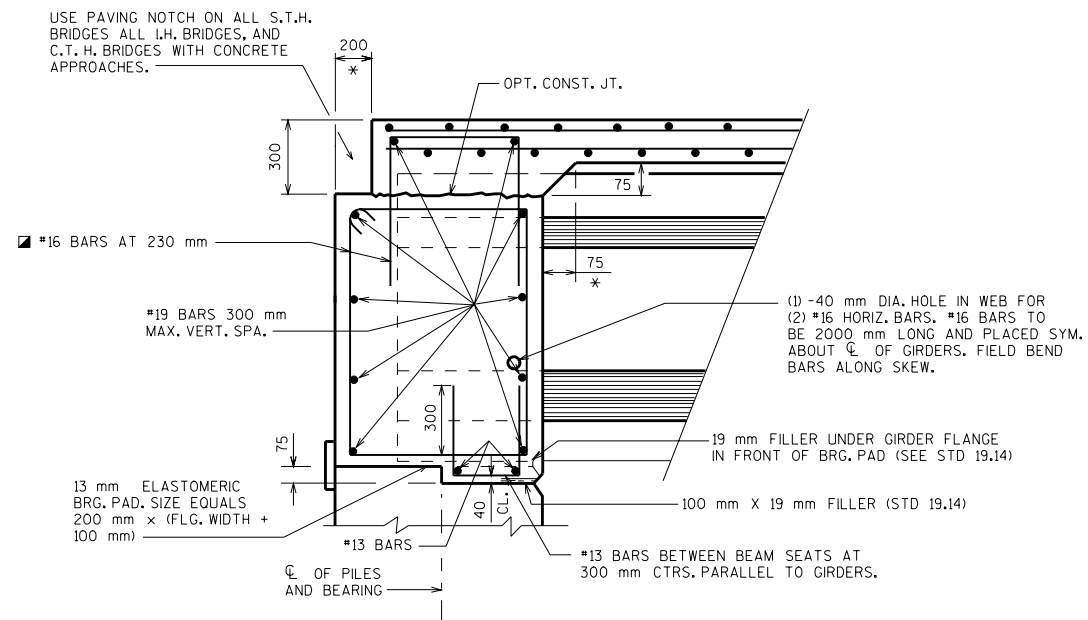
**FIXED END
FOR SKEWED AND SQUARE STRUCTURES**

DIAPHRAGM AT 13 mm ELASTOMERIC BEARING



EXPANSION END

NOTE: FOR EXPANSION DEVICE DETAILS NOT SHOWN SEE
STD. 28.1 FOR STRIP SEAL EXPANSION DEVICE.
SEE STD. 24.12 FOR TEMPORARY BRACING REQUIREMENT.



**PRESTRESSED GIRDER WITH
SEMI-EXPANSION SEAT**

EXPANSION END DIAPHRAGM STEEL

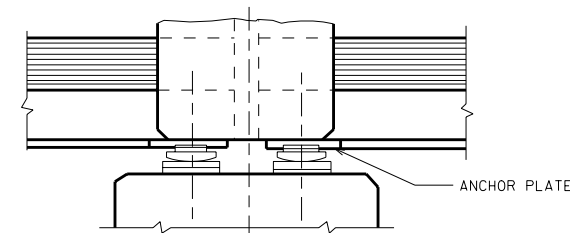
DIAPHRAGM LENGTH BETWEEN GIRDERS (CL TO CL OF GRDS.)	NO. OF BARS & BAR SIZE
≤ 2500 mm	6 - #19
> 2500 mm ≤ 3450 mm	6 - #22
> 3450 mm ≤ 4550 mm	6 - #25

NOTES

ALL DIMENSIONS ARE IN MILLIMETERS.
LAP LENGTHS FOR ALL BARS SHALL BE BASED
ON A "CLASS C" TENSION LAP SPLICE.

LEGEND

- THESE DIMENSIONS PARALLEL TO GIRDER
- * DIMENSION IS TAKEN NORMAL TO CL SUBSTRUCTURE UNITS.



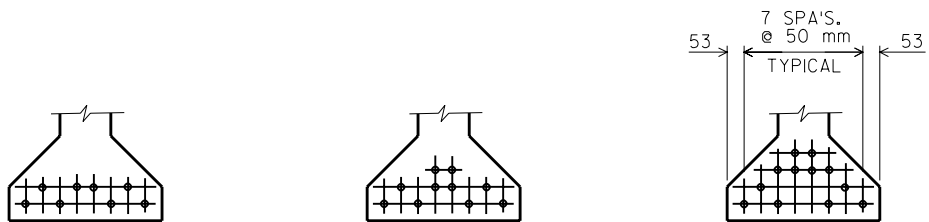
**DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS
SECTION THRU HAUNCH AT PIER**

SEE STANDARD 19.20 FOR 1370W & 1830W PRETENSIONED
GIRDERS, SLAB & SUPERSTRUCTURE DETAILS.

**PRETENSIONED GIRDERS
SLAB & SUPERSTRUCTURE DETAILS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

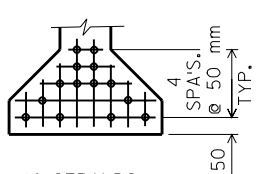
APPROVED: _____ DATE: 1-03



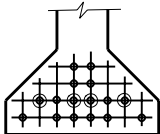
8 STRANDS

10 STRANDS

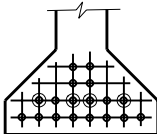
12 STRANDS



14 STRANDS



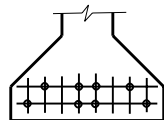
*16 STRANDS



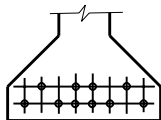
*18 STRANDS

⊙ INDICATES STRAND
TO BE DEBONDED

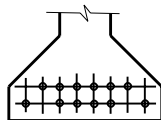
**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS**



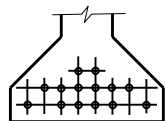
8 STRANDS



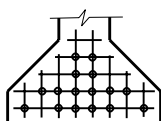
10 STRANDS



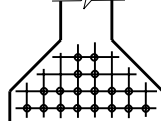
12 STRANDS



14 STRANDS



16 STRANDS



18 STRANDS

710 mm GIRDER

$A = 0.201 \text{ m}^2$
 $r^2 = 5.932 \times 10^{-2} \text{ m}^2$
 $y_T = 0.370 \text{ m}$
 $y_B = 0.340 \text{ m}$
 $I = 11.940 \times 10^{-3} \text{ m}^4$
 $S_T = 3.225 \times 10^{-2} \text{ m}^3$
 $S_B = 3.504 \times 10^{-2} \text{ m}^3$
 $WT. = 4.74 \text{ kN/m}$

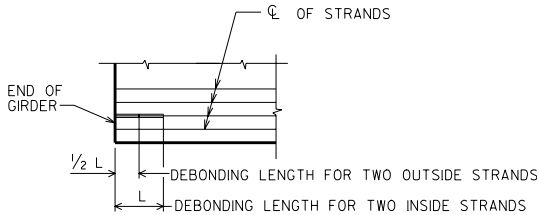
PRE-TENSION

$f'_s = 1860 \text{ MPa}$
 $f_s = 0.75 \times 1860 \text{ MPa} = 1395 \text{ MPa}$
for low relaxation strands
 $P_i \text{ PER } 13 \text{ mm } \phi \text{ STRAND} = 9.877 \times 10^{-5} \text{ m}^2 \times 1395 \text{ MPa} = \underline{137.8 \text{ kN.}}$
 $P_i \text{ PER } 15 \text{ mm } \phi \text{ STRAND} = 14.000 \times 10^{-5} \text{ m}^2 \times 1395 \text{ MPa} = \underline{195.3 \text{ kN.}}$
 $\frac{y_B}{r^2} = 5.73 \text{ m/m}^2$

(COMPRESSION IS NEGATIVE)

N	(1)	(2)	(3)	(4)	(4)	(5)	(5)
NO. STRANDS	e_s (meters)	$(1 + \frac{e_s y_B}{r^2})$	(A/(2)) (sq. m.)	P(ini t.)= $A_s f_s$ 0.5" ϕ STRANDS (kN)	P(ini t.)= $A_s f_s$ 0.6" ϕ STRANDS (kN)	f_B (ini t.)= $\frac{(4)}{(3)}$ 0.5" ϕ STRANDS (K/sq. m.)	f_B (ini t.)= $\frac{(4)}{(3)}$ 0.6" ϕ STRANDS (K/sq. m.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS							
8	0.264	2.51	0.080	1103	1562	-13.78	-19.53
10	0.249	2.43	0.083	1378	1953	-16.60	-23.53
12	0.222	2.27	0.089	1654	2344	-18.57	-26.34
14	0.202	2.16	0.093	1930	2734	-20.74	-29.40
*16	0.239	2.37	0.085	2205	3125	-25.94	-36.76
*18	0.244	2.40	0.084	2481	3515	-29.52	-41.85
STANDARD STRAND PATTERNS FOR DRAPED STRANDS							
8	0.264	2.52	0.080	1103	1562	-13.78	-19.53
10	0.249	2.43	0.083	1378	1953	-16.60	-23.53
12	0.264	2.51	0.080	1654	2344	-20.66	-29.30
14	0.254	2.46	0.082	1930	2734	-23.52	-33.34
16	0.239	2.37	0.085	2205	3125	-25.94	-36.76
18	0.244	2.40	0.084	2481	3515	-29.52	-41.85

* NEEDS BOND BREAKERS AT ENDS.
SEE BOND BREAKER DETAIL.



BOND BREAKER DETAIL

SHOWING LENGTHS OF DEBONDING
FROM END OF GIRDER. DEBOND
LENGTHS TO BE DESIGNED. STRAND
DEVELOPMENT LENGTH IS 760 mm

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS SHOWN OTHERWISE.

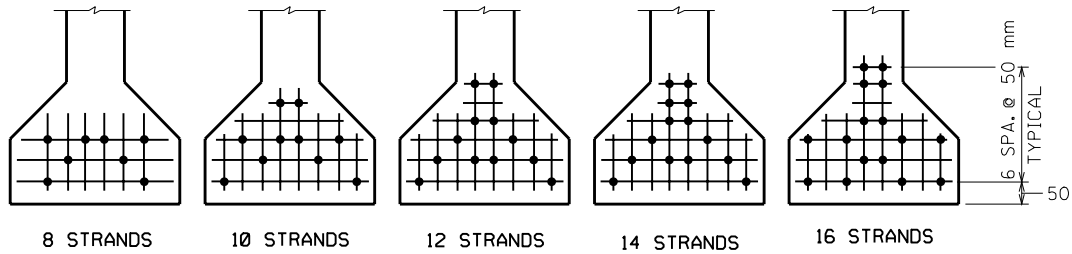
**710 mm PRETENSIONED GIRDER
DESIGN DATA**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

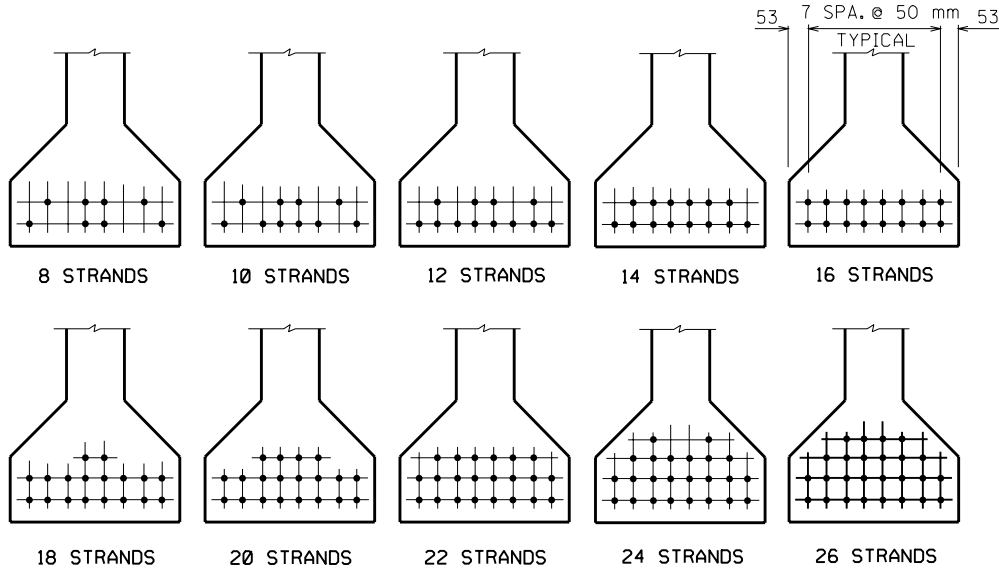
APPROVED: _____

DATE:
11/99

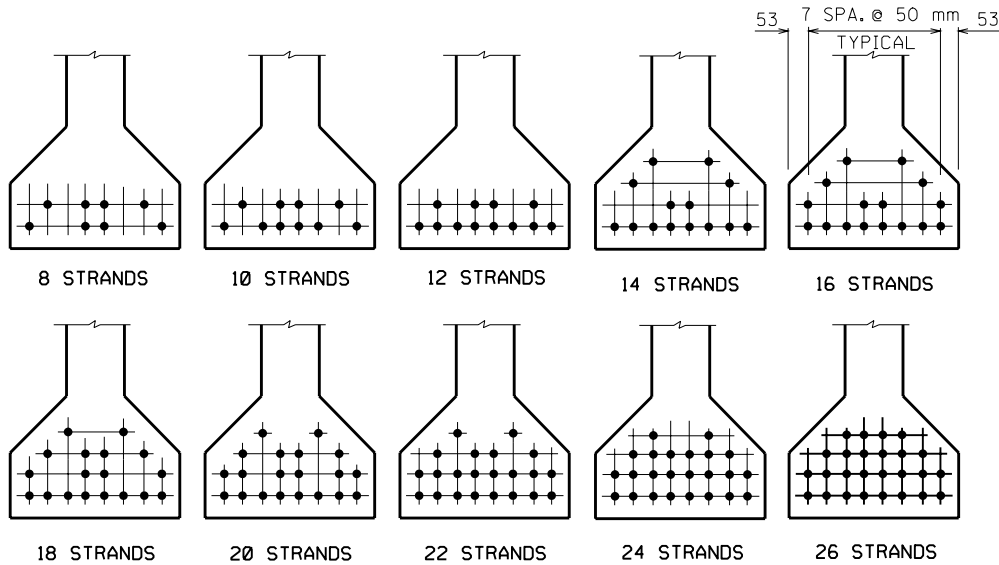
ARRANGEMENT AT CL SPAN - FOR GIRDERS WITH DRAPED 13 mm ϕ & 15 mm ϕ STRANDS



STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS



ARRANGEMENT AT 1/4 SPAN - FOR GIRDERS WITH DRAPED 13 mm φ STRANDS



ARRANGEMENT AT 1/4 SPAN - FOR GIRDERS WITH DRAPED 15 mm φ STRANDS

915 mm GIRDER

$A = 0.238 \text{ m}^2$
 $r^2 = 8.913 \times 10^{-2} \text{ m}^2$
 $y_t = 0.512 \text{ m}$
 $y_b = 0.402 \text{ m}$
 $I = 21.219 \times 10^{-3} \text{ m}^4$
 $S_t = 4.141 \times 10^{-2} \text{ m}^3$
 $S_b = 5.277 \times 10^{-2} \text{ m}^3$
 $WT. = 5.60 \text{ kN/m}$

PRE-TENSION

$f'_s = 1860 \text{ MPa}$
 $f_s = 0.75 \times 1860 \text{ MPa} = 1395 \text{ MPa}$
for low relaxation strands
 $P_i \text{ PER } 13 \text{ mm } \phi \text{ STRAND} = 9.877 \times 10^{-5} \text{ m}^2 \times 1395 \text{ MPa} = 137.8 \text{ kN}$
 $P_i \text{ PER } 15 \text{ mm } \phi \text{ STRAND} = 14.000 \times 10^{-5} \text{ m}^2 \times 1395 \text{ MPa} = 195.3 \text{ kN}$
 $\frac{y_b}{r^2} = 4.51 \text{ m/m}^2$

(COMPRESSION IS NEGATIVE)

N	(1) e_s 13 mm φ STRANDS (meters)	(1) e_s 15 mm φ STRANDS (meters)	(2) $(1 + \frac{e_s y_b}{r^2})$ 13 mm φ STRANDS	(2) $(1 + \frac{e_s y_b}{r^2})$ 15 mm φ STRANDS	(3) $(A/(2))$ 13 mm φ STRANDS (sq. m)	(3) $(A/(2))$ 15 mm φ STRANDS (sq. m)	(4) $P(\text{Init.}) = A_s f_s$ 13 mm φ STRANDS (kN)	(4) $P(\text{Init.}) = A_s f_s$ 15 mm φ STRANDS (kN)	(5) $f_b (\text{Init.}) = (4)/(3)$ 13 mm φ STRANDS (MPa)	(5) $f_b (\text{Init.}) = (4)/(3)$ 15 mm φ STRANDS (MPa)
STANDARD PATTERNS FOR UNDRAPED STRANDS										
8	0.288	0.288	2.298	2.298	0.104	0.104	1102	1562	-10.60	-15.02
10	0.260	0.260	2.172	2.172	0.110	0.110	1378	1953	-12.53	-17.75
12	0.250	0.250	2.126	2.126	0.112	0.112	1653	2344	-14.76	-20.93
14	0.235	0.235	2.061	2.061	0.115	0.115	1929	2734	-16.77	-23.77
16	0.231	0.231	2.040	2.040	0.117	0.117	2205	3125	-18.85	-26.71
STANDARD PATTERNS FOR DRAPED STRANDS										
8	0.326	0.326	2.470	2.470	0.096	0.096	1102	1562	-11.48	-16.27
10	0.331	0.331	2.493	2.493	0.095	0.095	1378	1953	-14.51	-20.56
12	0.334	0.334	2.506	2.506	0.095	0.095	1653	2344	-17.40	-24.67
14	0.329	0.308	2.484	2.389	0.096	0.100	1929	2734	-20.09	-27.34
16	0.326	0.307	2.470	2.385	0.096	0.100	2205	3125	-22.97	-31.25
18	0.318	0.300	2.434	2.353	0.098	0.101	2480	3515	-25.31	-34.80
20	0.311	0.300	2.403	2.353	0.099	0.101	2756	3906	-27.84	-38.67
22	0.305	0.300	2.376	2.353	0.100	0.101	3031	4297	-30.31	-42.54
24	0.296	0.296	2.335	2.335	0.102	0.102	3307	4687	-32.42	-45.95
26	0.289	0.289	2.303	2.303	0.103	0.103	3582	5078	-34.78	-49.30

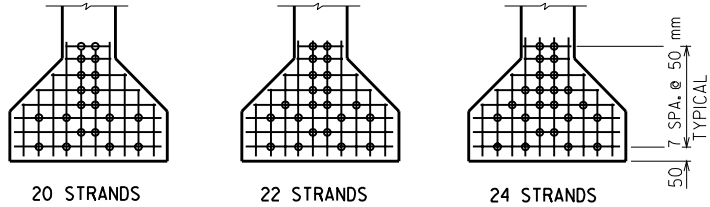
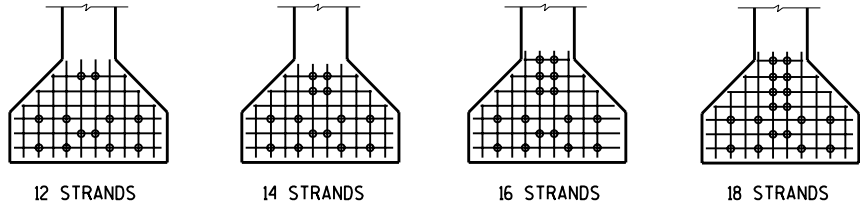
915 mm PRETENSIONED GIRDER
DESIGN DATA

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

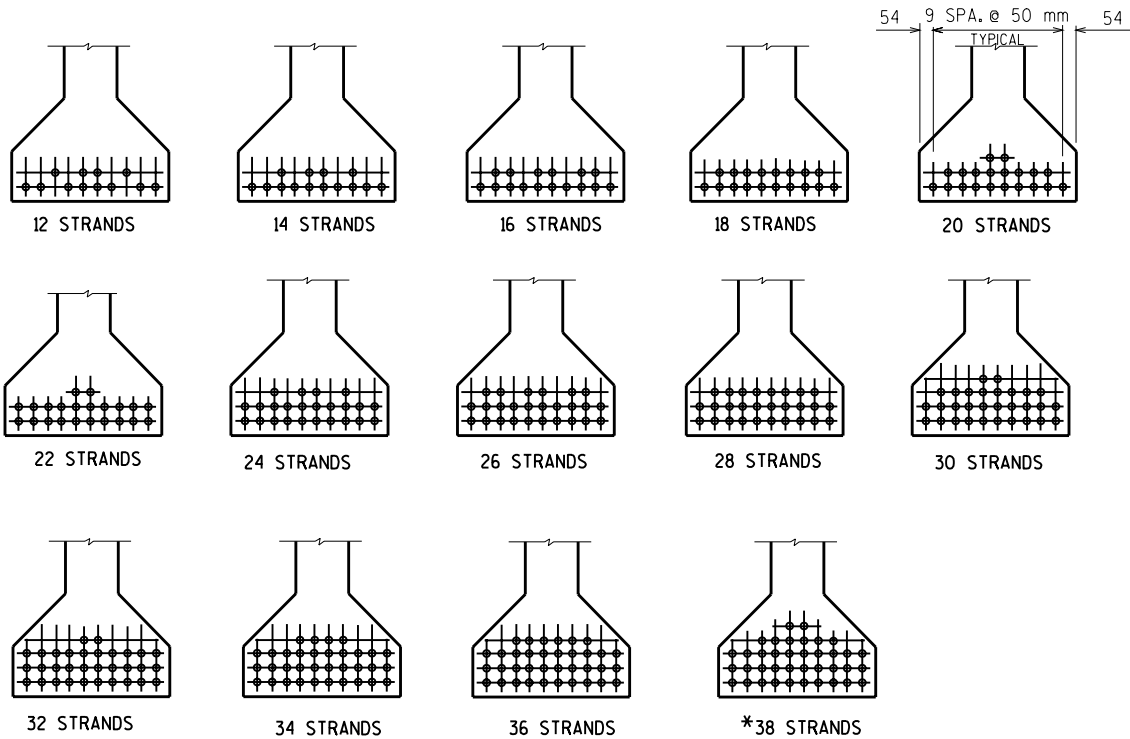
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DATE:
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ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS SHOWN OTHERWISE.



STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 13 MM ϕ & 15 MM ϕ STRANDS
*13 mm ϕ STRANDS ONLY

1145 mm GIRDER

$A = 0.361 \text{ m}^2$
 $r^2 = 14.446 \times 10^{-2} \text{ m}^2$
 $y_T = 0.628 \text{ m}$
 $y_B = 0.515 \text{ m}$
 $I = 52.191 \times 10^{-3} \text{ m}^4$
 $S_T = 8.308 \times 10^{-2} \text{ m}^3$
 $S_B = 10.137 \times 10^{-2} \text{ m}^3$
 $WT. = 8.51 \text{ kN/m}$

PRE-TENSION

$f_s' = 1860 \text{ MPa}$
 $f_s = 0.75 \times 1860 \text{ MPa} = 1395 \text{ MPa}$
for low relaxation strands.
 $P_i \text{ PER } 13 \text{ mm } \phi \text{ STRAND} = 9.877 \times 10^{-5} \text{ m}^2 \times 1395 \text{ MPa} = 137.8 \text{ kN}$
 $P_i \text{ PER } 15 \text{ mm } \phi \text{ STRAND} = 14.000 \times 10^{-5} \text{ m}^2 \times 1395 \text{ MPa} = 195.3 \text{ kN}$
 $\frac{y_B}{r^2} = 3.56 \text{ m/m}^2$

(COMPRESSION IS NEGATIVE)

N	(1)	(2)	(3)	(4)	(4)	(5)	(5)
NO. STRANDS	e_s (meters)	$(1 + \frac{e_s y_B}{r^2})$	(A/(2)) (sq. m.)	$P(\text{ini}+) = A_s f_s$ 13 mm ϕ STRANDS (kN)	$P(\text{ini}+) = A_s f_s$ 15 mm ϕ STRANDS (kN)	$f_B(\text{ini}+) = (4)/(3)$ 13 mm ϕ STRANDS (MPa)	$f_B(\text{ini}+) = (4)/(3)$ 15 mm ϕ STRANDS (MPa)
STANDARD PATTERNS FOR UNDRAPED STRANDS							
12	0.379	2.353	0.153	1653	2344	-10.80	-15.32
14	0.362	2.292	0.158	1929	2734	-12.21	-17.30
16	0.337	2.201	0.164	2205	3125	-13.45	-19.05
18	0.334	2.190	0.165	2480	3515	-15.03	-21.30
20	0.312	2.111	0.171	2756	3906	-16.12	-22.84
22	0.312	2.111	0.171	3031	4297	-17.73	-25.13
24	0.307	2.095	0.172	3307	4687	-19.23	-27.25
12	0.447	2.593	0.139	1653	2344	-11.89	-16.86
14	0.450	2.602	0.139	1929	2734	-13.88	-19.67
16	0.445	2.586	0.140	2205	3125	-15.75	-22.32
18	0.441	2.573	0.140	2480	3515	-17.71	-25.11
20	0.434	2.545	0.142	2756	3906	-19.41	-27.51
22	0.432	2.540	0.142	3031	4297	-21.35	-30.26
24	0.426	2.518	0.143	3307	4687	-23.13	-32.78
26	0.421	2.501	0.144	3582	5078	-24.88	-35.26
28	0.417	2.486	0.145	3858	5468	-26.61	-37.71
30	0.410	2.460	0.147	4134	5859	-28.12	-39.86
32	0.407	2.450	0.147	4409	6250	-29.99	-42.52
34	0.401	2.430	0.149	4685	6640	-31.44	-44.56
36	0.396	2.412	0.150	4960	7031	-33.07	-46.87
38	0.389	2.387	0.151	5236		-34.68	

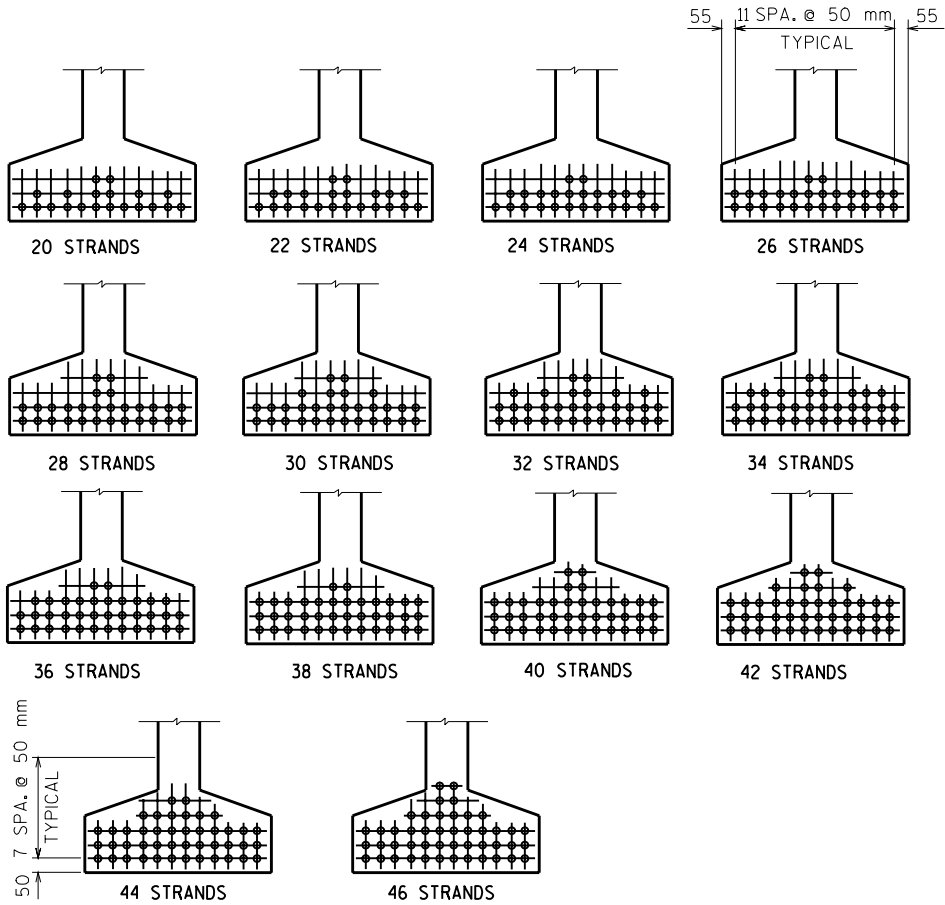
1145 mm PRETENSIONED GIRDER
DESIGN DATA

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

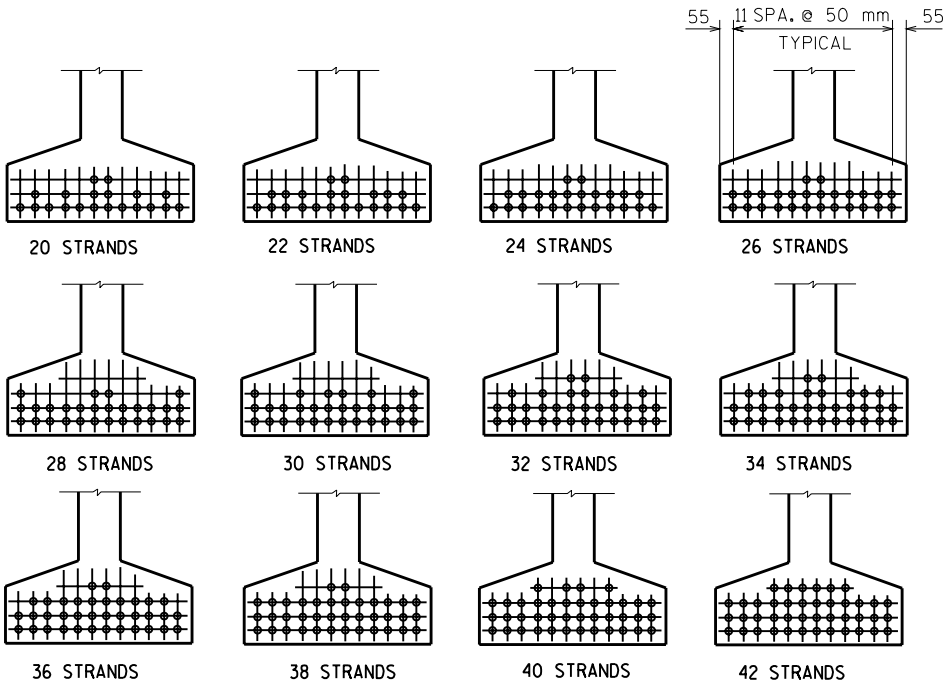
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11/99

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS SHOWN OTHERWISE.



ARRANGEMENT AT CL SPAN FOR GIRDERS WITH DRAPED 0.5" ØSTRANDS



ARRANGEMENT AT CL SPAN FOR GIRDERS WITH DRAPED 0.6" ØSTRANDS

1780 mm GIRDER

A = 0.499 m²
I = 212.533 X 10⁻³ m⁴
r² = 42.592 X 10⁻² m²
y_T = 0.900 m
y_B = 0.880 m
S_T = 23.647 X 10⁻² m³
S_B = 24.172 X 10⁻² m³
WT. = 11.76 kN/m + 30 kN FOR BOTH END BLOCKS

PRE-TENSION

f_sⁱ = 1860 MPa
f_s = 0.75 X 1860 MPa = 1395 MPa
for low relaxation strands.
Pi PER 13 mm Ø STRAND = 9.877 X 10⁻⁵ m² X 1395 MPa = 137.8 kN
Pi PER 15 mm Ø STRAND = 13.999 X 10⁻⁵ m² X 1395 MPa = 195.3 kN

y_B / r² = 2.06 m/m²

(COMPRESSION IS NEGATIVE)

N	(1) e _s 13 mm Ø STRANDS (meters)	(1) e _s 15 mm Ø STRANDS (meters)	(2) e _s y _B / r ² (1 + e _s y _B / r ²) 13 mm Ø STRANDS	(2) e _s y _B / r ² (1 + e _s y _B / r ²) 15 mm Ø STRANDS	(3) (A/(2)) 13 mm Ø STRANDS (sq. m.)	(3) (A/(2)) 15 mm Ø STRANDS (sq. m.)	(4) P(Init.) = A _s f _s 13 mm Ø STRANDS (kN)	(4) P(Init.) = A _s f _s 15 mm Ø STRANDS (kN)	(5) f _B (Init.)=(4)/(3) 13 mm Ø STRANDS (MPa)	(5) f _B (Init.)=(4)/(3) 15 mm Ø STRANDS (MPa)
STANDARD PATTERNS FOR DRAPED STRANDS										
20	0.803	0.803	2.659	2.659	0.188	0.188	2756	3906	-14.660	-20.777
22	0.801	0.801	2.655	2.655	0.188	0.188	3032	4296	-16.128	-22.851
24	0.799	0.799	2.650	2.650	0.188	0.188	3308	4687	-17.596	-24.931
26	0.797	0.797	2.647	2.647	0.189	0.189	3583	5077	-18.958	-26.862
28	0.789	0.792	2.630	2.637	0.190	0.189	3858	5468	-20.305	-28.931
30	0.785	0.788	2.622	2.628	0.190	0.190	4134	5859	-21.758	-30.837
32	0.781	0.781	2.613	2.613	0.191	0.191	4410	6249	-23.089	-32.717
34	0.778	0.778	2.607	2.607	0.191	0.191	4685	6640	-24.528	-34.764
36	0.775	0.775	2.601	2.601	0.192	0.192	4961	7030	-25.839	-36.615
38	0.772	0.772	2.596	2.596	0.192	0.192	5236	7421	-27.271	-38.651
40	0.765	0.767	2.581	2.585	0.193	0.193	5512	7811	-28.560	-40.472
42	0.761	0.763	2.572	2.577	0.194	0.194	5788	8202	-29.835	-42.278
44	0.757	0.757	2.564	2.564	0.195	0.195	6063	—	-31.092	—
46	0.749	0.749	2.547	2.547	0.196	0.196	6338	—	-32.337	—

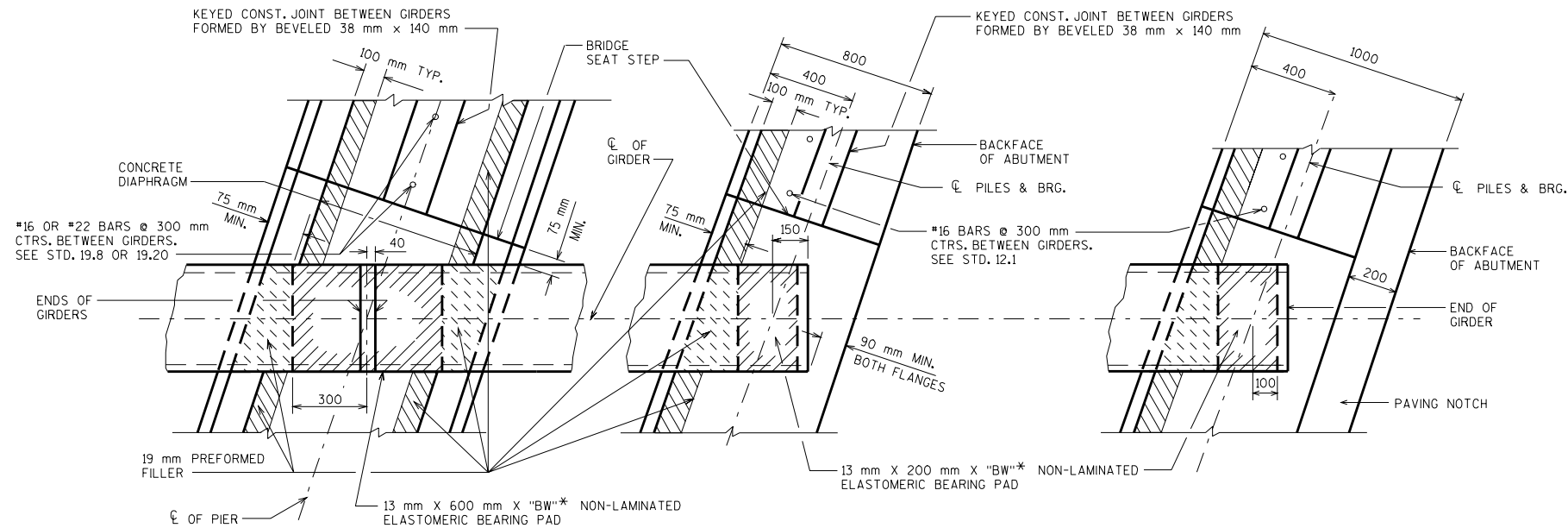
ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS SHOWN OTHERWISE.

1780 mm PRETENSIONED GIRDER
DESIGN DATA

STATE OF WISCONSIN
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3/00



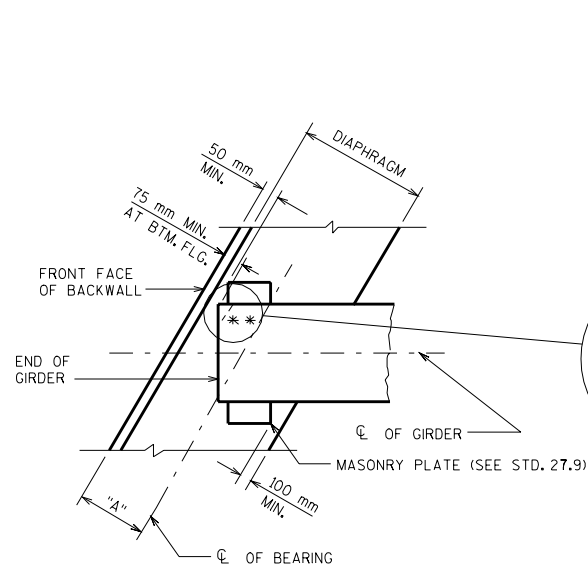
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AT ABUTMENT

ABUTMENT: TYPE "A1 FIXED" AND "A5" W/O PAVING NOTCH

AT ABUTMENT

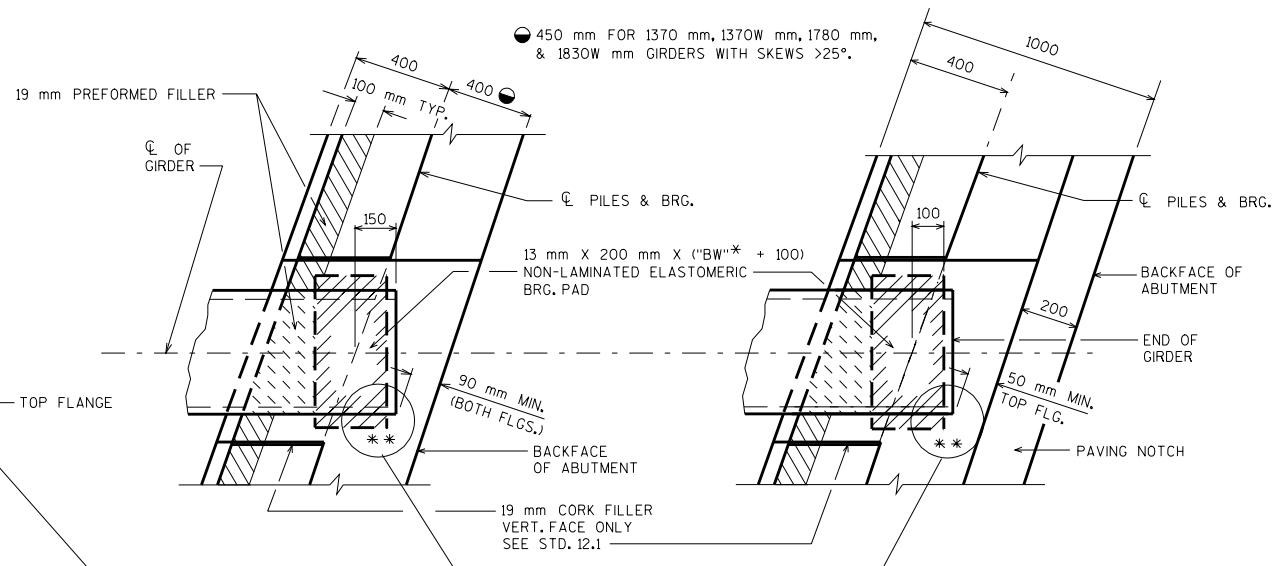
ABUTMENT: TYPE "A1 FIXED" AND "A5" WITH PAVING NOTCH.



PLAN AT ABUTMENT

ABUTMENT: TYPE "A3" OR "A4" SEE TABLE FOR MIN. "A" VALUES REQ'D. TO MEET MIN. CLEARANCE CRITERIA ABOVE.

** FORM-OUT CORNER OF TOP FLANGE ON 1370W mm, 1780 mm, & 1830W mm PRESTRESSED GIRDERS TO MEET MIN. CLEARANCE REQ'D.



AT ABUTMENT

ABUTMENT: TYPE "A1 SEMI-EXP." W/O PAVING NOTCH

AT ABUTMENT

ABUTMENT: TYPE "A1 SEMI-EXP." WITH PAVING NOTCH.

ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT AS OTHERWISE SHOWN OR NOTED.

MIN. 'A' DIMENSION IN (mm) FOR A3 AND A4 ABUTMENTS WITH STEEL BEARINGS AS SHOWN ON STD. 27.9.							
SKEW ANGLE °	GIRDER DEPTHS (mm)						
	710	915	1145	1370	1370W	1780	1830W
0-5	305	305	305	305	305	305	305
> 5-15	305	305	305	320	330	330	330
> 15-25	320	320	330	355	380	380	380
> 25-35	(355)	(355)	(380)	(420)	(445)	420	(445)
> 35-45	(395)	(395)	(430)	(470)	(510)	(470)	(510)
> 45-55	(430)	(430)	(470)	(510)	(545)	(510)	(545)

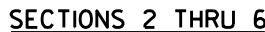
VALUES IN PARENTHESIS ARE CONTROLLED BY 50 mm CLR. CRITERIA AT EDGE OF MASONRY PLATE. VALUES MAY BE ADJUSTED IF MASONRY PLATE IS CLIPPED PER STANDARD 27.2.

PRESTRESSED GIRDER FLANGE WIDTH TABLE							
GIRDER DEPTH (mm)	710	915	1145	1370	1370W	1780	1830W
TOP FLANGE WIDTH (mm)	456	304	406	1219	508	762	508
BOTTOM FLANGE WIDTH "BW"* (mm)	456	456	558	762	660	660	660

BEARING PAD DETAILS FOR PRESTRESSED CONCRETE GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

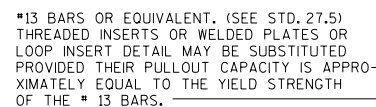
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SECT NO.	DEPTH (mm)	"A" (mm)	"B" (mm)
1	305	190	190
2	430	230	305
3	535	305	405
4	685	380	560
5	840	380	710
6	1065	380	940

OMIT SHEAR KEY ON
EXTERIOR FACE OF
EXTERIOR GIRDERS.

SEE CHAPTER 19 OF THIS MANUAL
FOR POLICY ON SELECTING 915 mm
SECTIONS OR 1220 mm SECTIONS.



115 mm DIA. HOLE FOR POST-TENSIONING AT MIDSPAN FOR SPANS UP TO 15000 mm. TWO HOLES 2000 mm FROM \bar{C} (4000 mm APART) FOR SPANS OVER 15000 mm TO 20000 mm. AT QUARTER POINTS FOR SPANS OVER 20000 mm (3 HOLES). —

OPTIONAL CONSTRUCTION JOINT. END BLOCK
MAY BE POURED WITH GRADES "A", "C", "D"
OR "E" CONCRETE. _____



TYPICAL LONGITUDINAL SECTION



ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT AS NOTED.

FOUR WAY SLING MUST BE USED TO ENGAGE ALL 4 LIFTING DEVICES
ON BOTH ENDS OF UNITS.

STRANDS SHALL BE FLUSH WITH END OF UNIT.

VOIDS SHALL BE VENTED AND DRAINED BY CASTING A 25 mm ϕ TUBE AT EACH END AND CENTER OF VOID SEGMENT.

SLOPE BEAM SEATS TO MATCH ROADWAY CROWN.

SLOPE BEAM SEATS PARALLEL TO GRADE LINE IF GRADE AT BRG. $> 1\%$.
PLACE ELEVATIONS ON PLANS TO MEET THESE REQUIREMENTS.

POST-TENSIONING OF THE TRANSVERSE TENDONS SHALL NOT BEGIN UNTIL THE GROUT BETWEEN THE PRECAST BEAMS HAS BEEN ALLOWED TO CURE FOR 48 HOURS.

BAR STEEL REINFORCEMENT SHALL BE GRADE 420. (FY=420 MPa).

PRESTRESSING STEEL ULTIMATE STRENGTH = 1860 MPa.

PRESTRESSED CONCRETE STRENGTH AT 28 DAYS = 35 MPa.

THE CEMENT AND FINE AGGREGATE FOR THE GROUT BETWEEN THE POST-TENSIONED BEAMS SHALL BE PROPORTIONED BY WEIGHT AS INDICATED IN THE FOLLOWING TABLE. THE CEMENT USED SHALL BE TYPE I. WATER SHALL BE ADDED IN AMOUNTS AS NECESSARY TO OBTAIN APPROXIMATELY A 130 mm SLUMP OR TO A CONSISTENCY TO INSURE THAT THE VOIDS ARE COMPLETELY FILLED. THE GROUT SHALL BE RODDED TO INSURE THAT THE VOIDS ARE COMPLETELY FILLED.

CEMENT PER cu. m.	FINE AGGREGATE PER cu. m.
545 kg.	1395 kg. SSD AT 2.65 SPECIFIC GRAVITY

THE MAXIMUM ALLOWABLE SKEW ANGLE OF THE STRUCTURE SHALL BE 45°.

ABUTMENT BACKWALLS AND CONCRETE OVERLAY SHALL NOT BE
POURED UNTIL AFTER THE POST-TENSIONING HAS BEEN COMPLETED.

SEAL WASHER SHALL BE SPONGE NEOPRENE GASKET 60 mm MIN. THICK.
STRESS POCKETS SHALL BE FILLED WITH CHLORIDE FREE NON-SHRINK
GROUT AFTER POST-TENSIONING (REFER TO SPECIAL PROVISION FOR
NON-SHRINK GROUT SPECIFICATIONS.)

TRANSITION BETWEEN CHANGING SLOPES OF POST-TENSIONING DUCTS SHALL BE PROVIDED BY EITHER A CIRCULAR OR PARABOLIC CURVE WITH A MINIMUM LENGTH OF 915 mm.

POST-TENSIONING DUCTS SHALL BE PRESSURE GROUTED FROM ONE GROUT PIPE UNTIL ALL ENTRAPPED AIR IS EXPELLED AND GROUT BEGINS TO FLOW FROM THE OPEN GROUT PIPE. THE OPEN GROUT PIPE SHALL BE CLOSED AND A PRESSURE OF 0.345 MPa MAINTAINED FOR 15 SECONDS. THE GROUT COMPOSITION SHALL BE 42.7 kg OF TYPE I CEMENT, 18.9 LITERS OF WATER AND 0.45 kg OF APPROVED PLASTICIZER OR A PRE-MIXED PACKAGED GROUT APPROVED BY THE STRUCTURES DESIGN SECTION.

LEGEND

* WHEN WINGS ARE PARALLEL TO ABUTMENT \mathbb{C} , CHOOSE THESE DIMENSIONS TO ALLOW FOR EASE OF POST-TENSIONING OPERATION.

■ MINIMUM INSTALLATION WIDTH PLUS 6 mm.

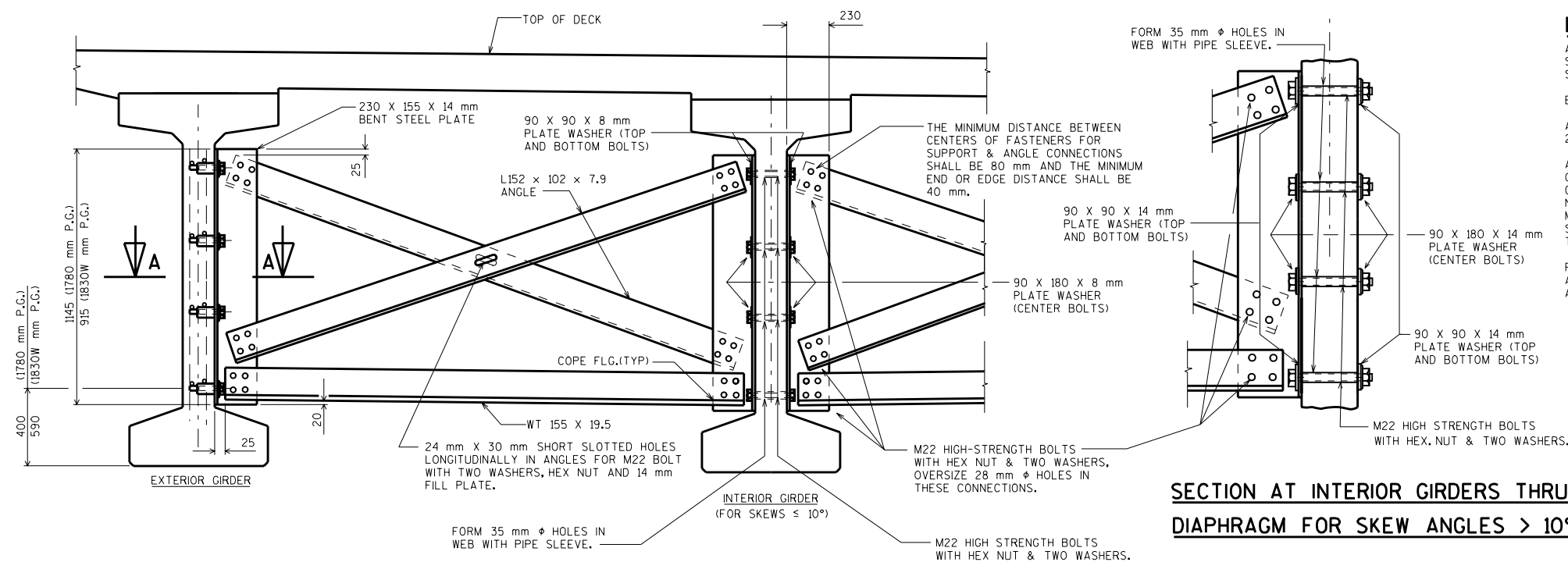
▲ PLACE 19 mm FILLER BETWEEN BEARING PADS.

PRETENSIONED SLAB & BOX SECTIONS POST-TENSIONED TRANSVERSELY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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**SECTION AT INTERIOR GIRDERS THRU
DIAPHRAGM FOR SKEW ANGLES > 10°**

NOTES

ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STEEL DIAPHRAGM," STRUCTURE, EACH.

EACH DIAPHRAGM BETWEEN GIRDERS SHALL CONSTITUTE ONE UNIT.

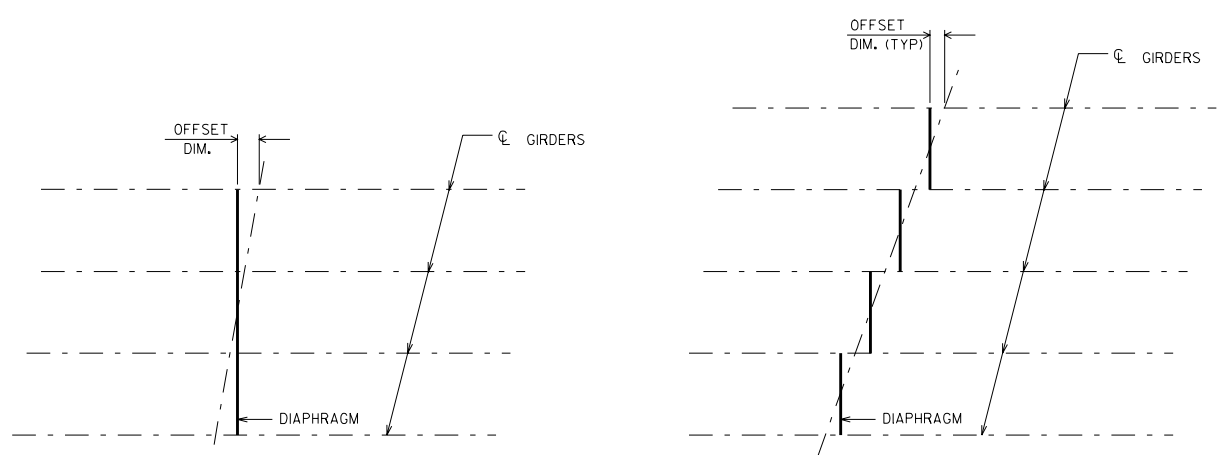
ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709M GRADE 250. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325M TYPE 1.

ALL DIAPHRAGM STRUCTURAL STEEL SHOWN SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563M AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S1 OF ASTM A563, LUBRICANT AND TEST FOR COATED NUTS.

FOR SPANS EQUAL TO OR LESS THAN 24000 mm PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 24000 mm PLACE AT 1/3 AND 2/3 POINTS.

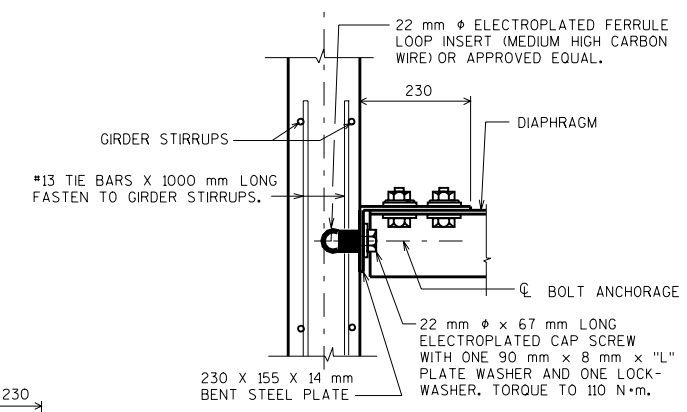
PART TRANSVERSE SECTION AT DIAPHRAGM

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.



PLAN FOR SKEW ANGLES ≤ 10°

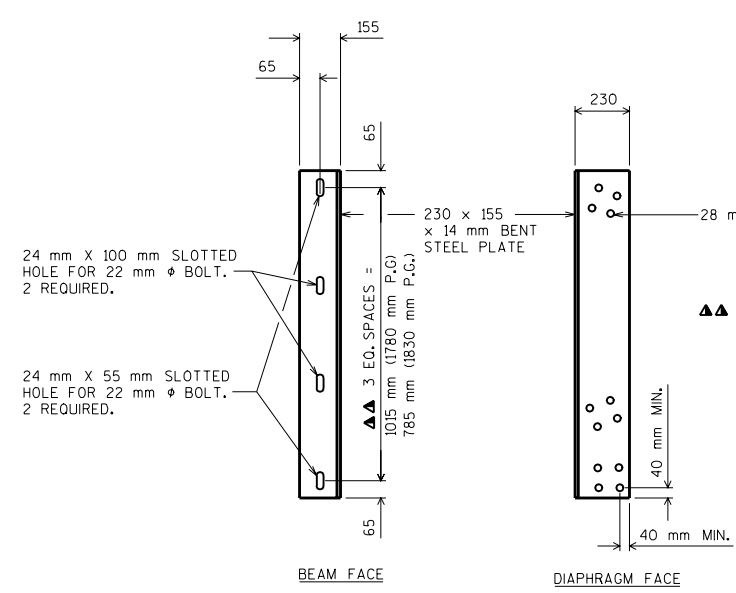
PLAN FOR SKEW ANGLES > 10°



SECT. A-A

(FOR EXTERIOR ATTACHMENT)

"L" = 90 mm; TOP & BOTTOM BOLTS
"L" = 180 mm; CENTER BOLTS



DIAPHRAGM SUPPORT

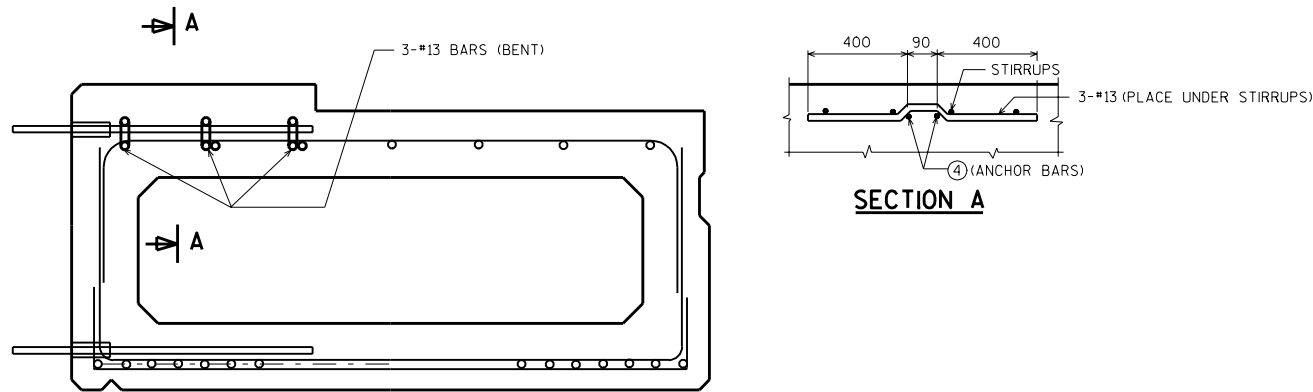
▲▲ BOLT HOLES SHALL BE SPACED SO AS TO MISS PRESTRESSED STRANDS IN CONCRETE BEAMS.

**INTERMEDIATE STEEL DIAPHRAGMS
FOR 1780 mm & 1830 mm
PRESTRESSED GIRDERS**

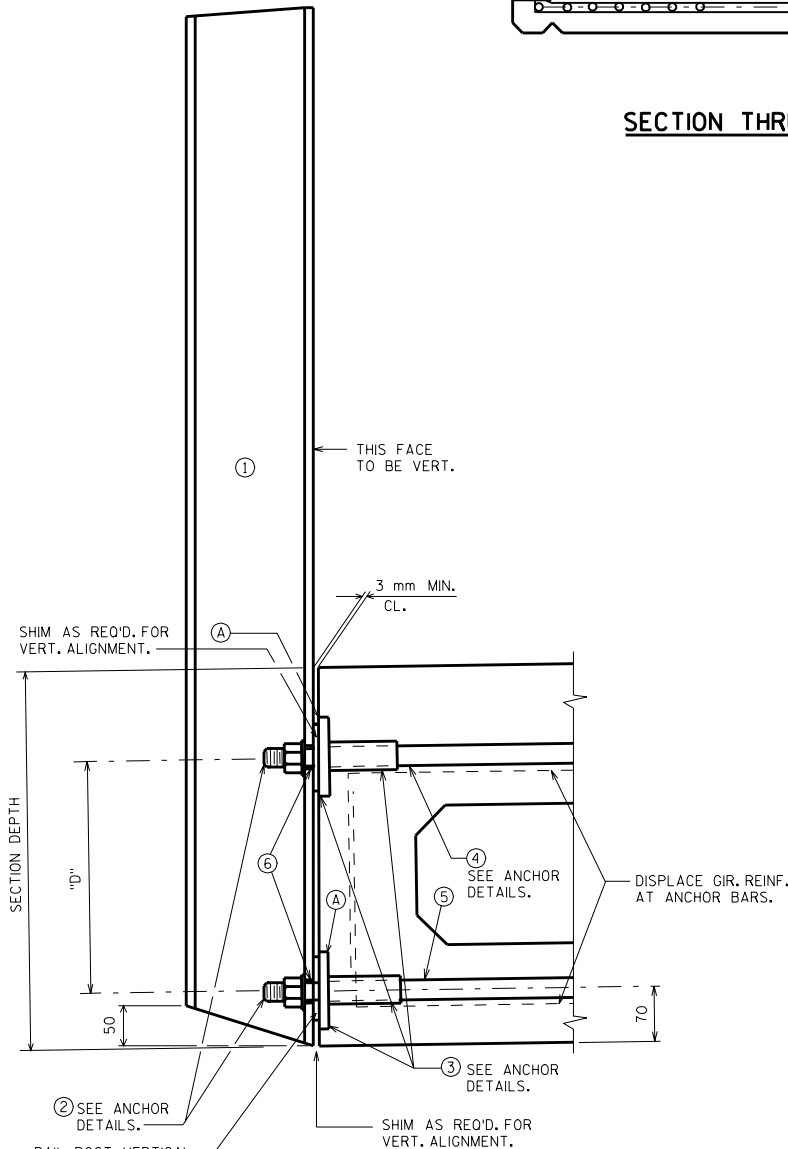
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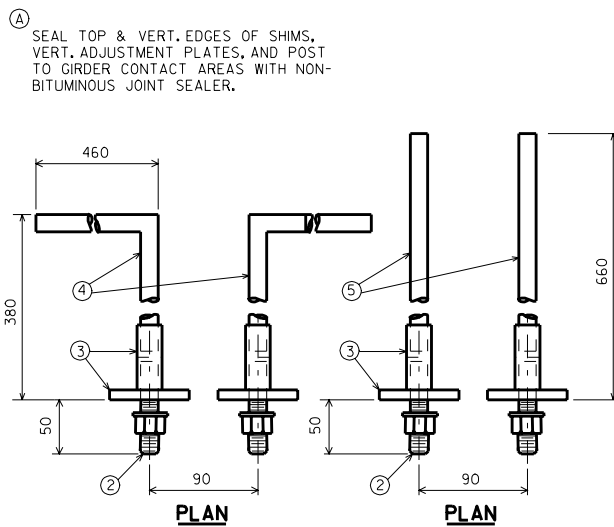


SECTION THRU EXTERIOR GIRDER



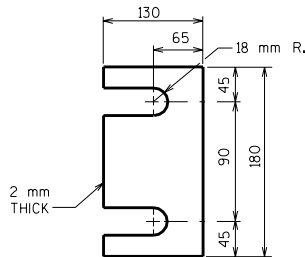
SECTION THRU RAILING

SECTION DEPTH (mm)	"D" (mm)
305	180
430	305
535	405
685	560
840	710
1065	940



ANCHOR DETAILS

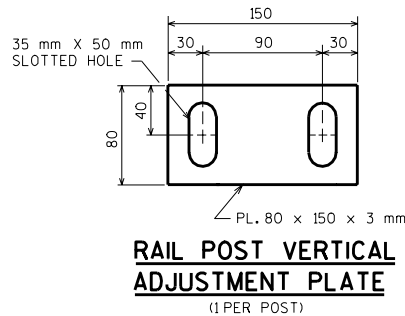
ANCHORS MAY BE FABRICATED IN A CAGE IF OPTED BY THE MFG'R.



POST SHIM

DETAIL

(14 PER POST)



RAIL POST VERTICAL
ADJUSTMENT PLATE

(1 PER POST)

PRETENSIONED SLAB & BOX
SECTION RAILING POST
ATTACHMENT

STATE OF WISCONSIN
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LEGEND

- ① W150 x 37. SEE STD. 30.1 OR 30.2 FOR RAILING ATTACHMENT. PLACE POSTS NORMAL TO GRADE LINE. PLACE POSTS VERTICAL.
- ② 25 mm DIA. STUD WITH NUT & WASHER. FOUR REQ'D. PER POST, A325M.*
- ③ THREADED BAR COUPLER FOR 25 mm ϕ STUD. ACCEPTABLE PRODUCTS ARE WILLIAMS REBAR FLANGE COUPLERS BY WILLIAMS FORM ENGINEERING CORP. OR DOWEL BAR REPLACEMENTS BY DAYTON SUPERIOR. FOUR REQ'D. PER POST. EXPOSED FLANGE TO BE GALVANIZED.*
- ④ ANCHOR BAR 25 mm DIA. THREADED REINFORCEMENT BAR BENT AS SHOWN IN ANCHOR DETAILS, GRADE 420. TWO REQ'D. PER POST. (TOP)**
- ⑤ ANCHOR BAR, 25 mm DIA. THREADED REINFORCEMENT BAR (STRAIGHT), GRADE 420. TWO REQ'D. PER POST. (BOTTOM)**
- ⑥ 35 mm x 45 mm SLOTTED HOLES IN POST FOR STUD NO. 2. LONG DIMENSION OF SLOTTED HOLE TO BE VERTICAL.

*SHALL BE MECHANICALLY GALVANIZED OR ELECTRO-PLATED.

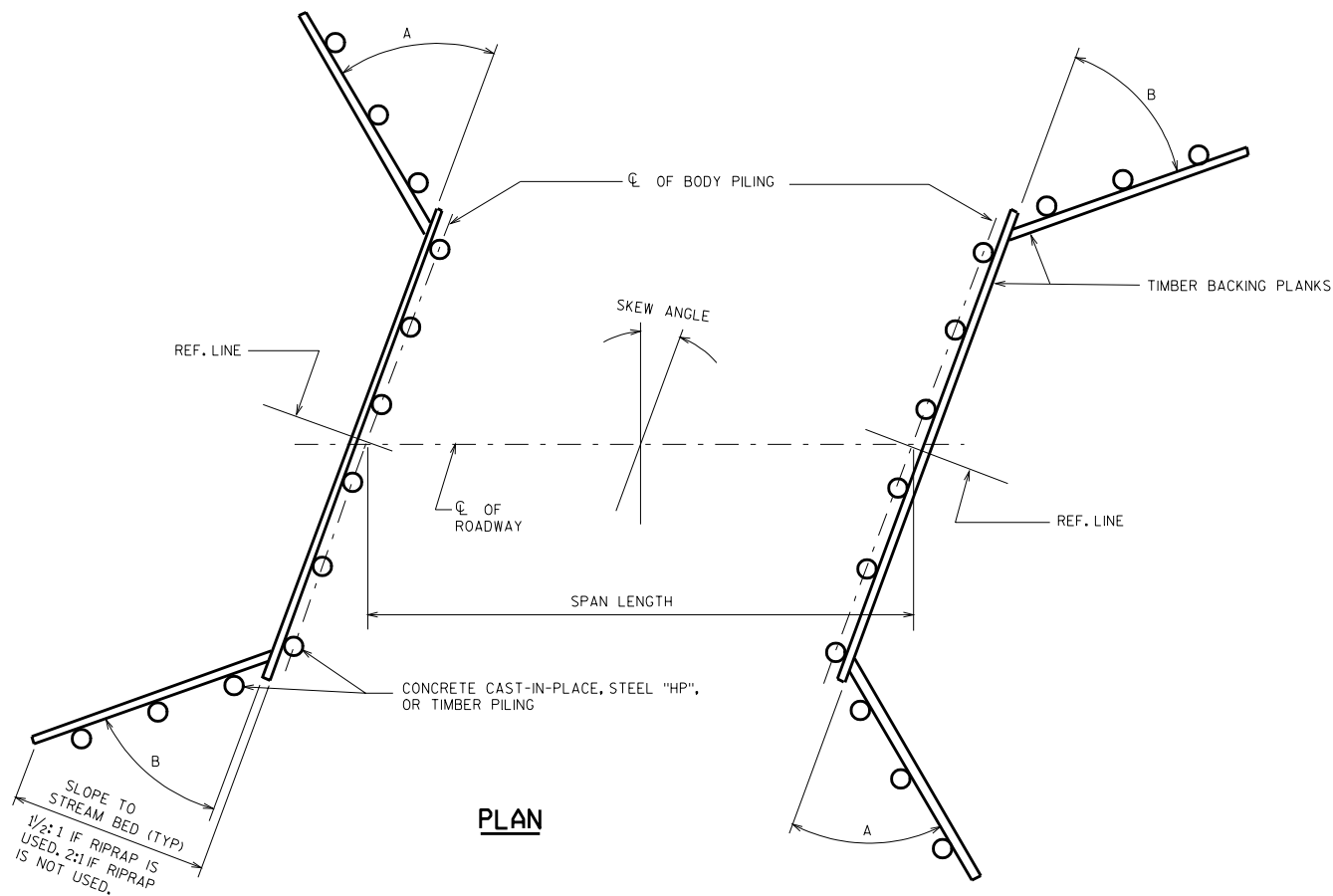
**NOT GALVANIZED OR ELECTRO-PLATED.

GENERAL NOTES

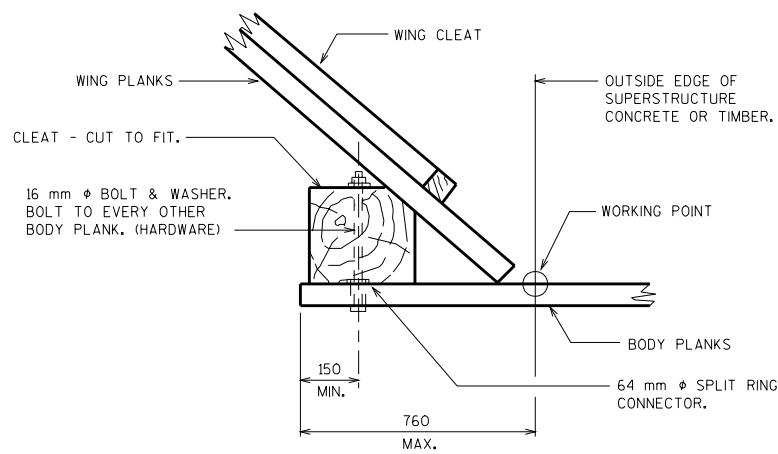
FILL BOLT SLOT OPENINGS IN POST SHIMS AND POSTS WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

STEEL POST SHIMS MAY BE USED AT POSTS WHERE REQ'D. FOR ALIGNMENT.

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.



PLAN



CORNER DETAIL

NOTES

- ALL TIMBER CONNECTORS AND HARDWARE EXCEPT THOSE OF MALLEABLE IRON SHALL BE GALVANIZED.
- TREAT ALL LUMBER AND TIMBER WITH ONE OF THE PRESERVATIVES RECOMMENDED IN THE CONSTRUCTION SPECIFICATIONS.
- TIE RODS SHALL BE COATED WITH THE COAL TAR OR BITUMASTIC COMPOUND USED FOR COVERING WING PILE ENDS.
- REFER TO A.A.S.H.T.O. SPECIFICATIONS FOR ALLOWABLE LUMBER AND TIMBER STRESSES.
- THE BODY BACKING PLANKS SHALL BE CONTINUOUS OVER 4 PILES (3 PANELS). PLANK SPLICES, IF REQUIRED SHALL BE AT THE CENTERLINE OF PILING AND ADJACENT SPLICES SHALL BE STAGGERED.
- ALL TIE RODS, TURNBUCKLES, NUTS AND WASHERS SHALL BE PAID FOR AS "STRUCTURAL CARBON STEEL".
- TIMBER CONNECTORS AND HARDWARE SHALL BE INCLUDED IN THE COST FOR "TREATED LUMBER AND TIMBER".
- ALTERNATE DETAILS MAY BE SUBMITTED USING EITHER GALVANIZED STEEL BRIDGE PLANK OR PRECAST CONCRETE PLANK IN LIEU OF TIMBER BACKED ABUTMENT PLANKING, SUBJECT TO APPROVAL BY THE ENGINEER.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

SKEW ANGLE	"H" HEIGHT FROM STREAM BED OR BERM TO GRADE	WING ANGLE "A"	WING ANGLE "B"
0° TO 15° INCL.	$H \leq 3050 \text{ mm}$	45°	45°
0° TO 15° INCL.	* $H > 3050 \text{ mm}$	50°	50°
15° TO 20° INCL.	$H \leq 3050 \text{ mm}$	55°	30°
15° TO 20° INCL.	* $H > 3050 \text{ mm}$	50°	50°
OVER 20°	$H \leq 3050 \text{ mm}$	65°	25°
OVER 20°	● $H > 3050 \text{ mm}$	65°	25°

- * USE TIE RODS ON WING PILING
- USE TIE RODS WITH A DEADMAN ON WING PILING.

SECTION	MOMENT CAPACITY (kN-m/m)
64 mm TIMBER	8.0 ($f_b = 8.3 \text{ MPa}$)
89 mm TIMBER	14.2 ($f_b = 8.3 \text{ MPa}$)
10 GAGE (1830 x 610 mm) GRADE A * ARMC0	8.5 ($f_b = 124.1 \text{ MPa}$)
7 GAGE (1830 x 610 mm) GRADE A * ARMC0	11.1 ($f_b = 124.1 \text{ MPa}$)

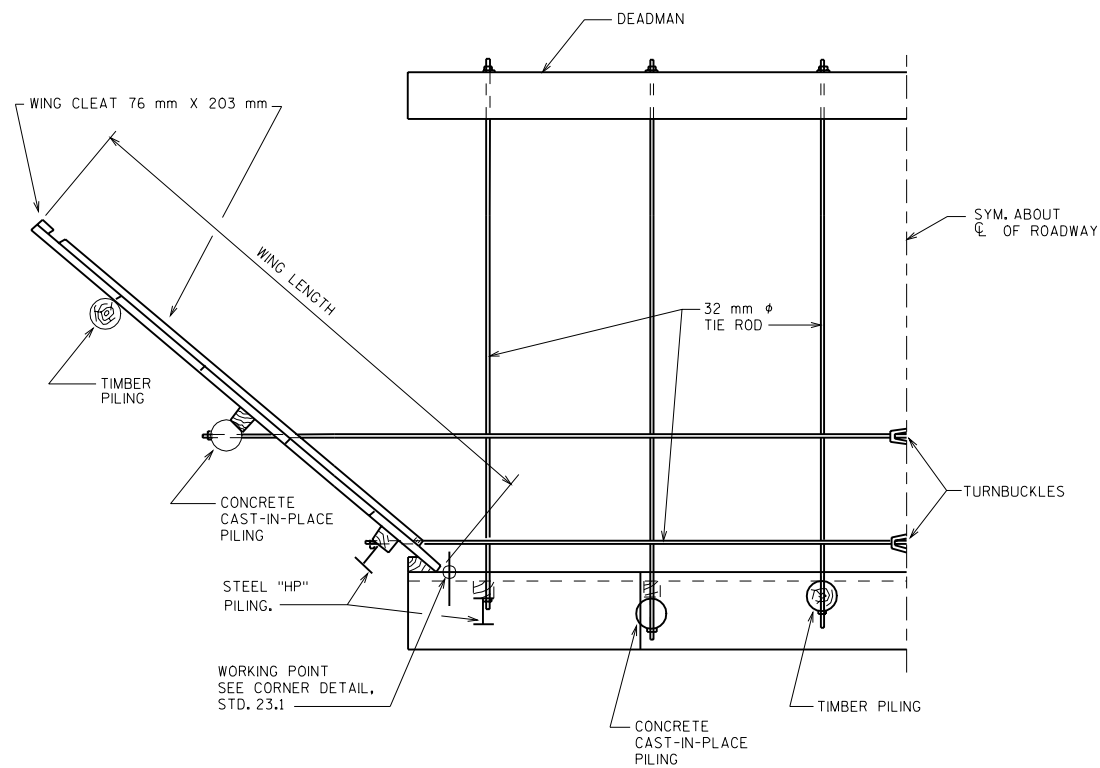
*A.S.T.M. A446M

TIMBER ABUTMENTS
GENERAL

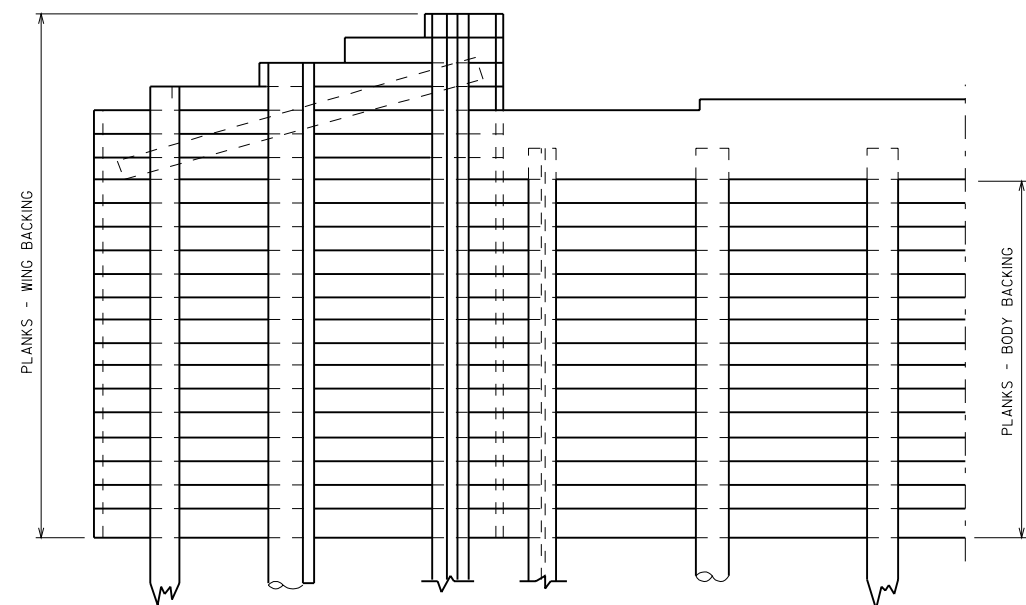
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

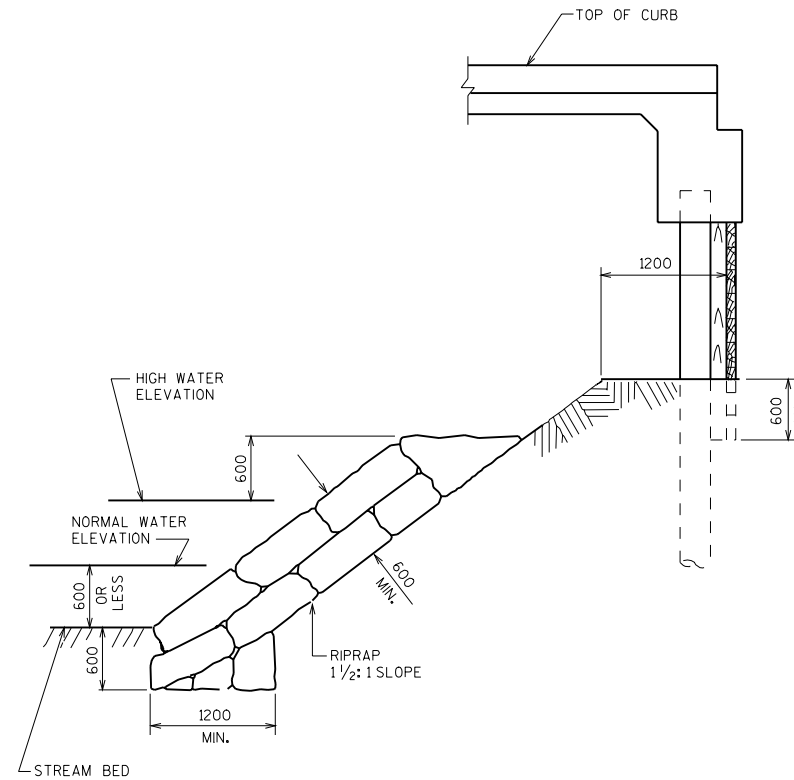
DATE:
1/99



HALF PLAN

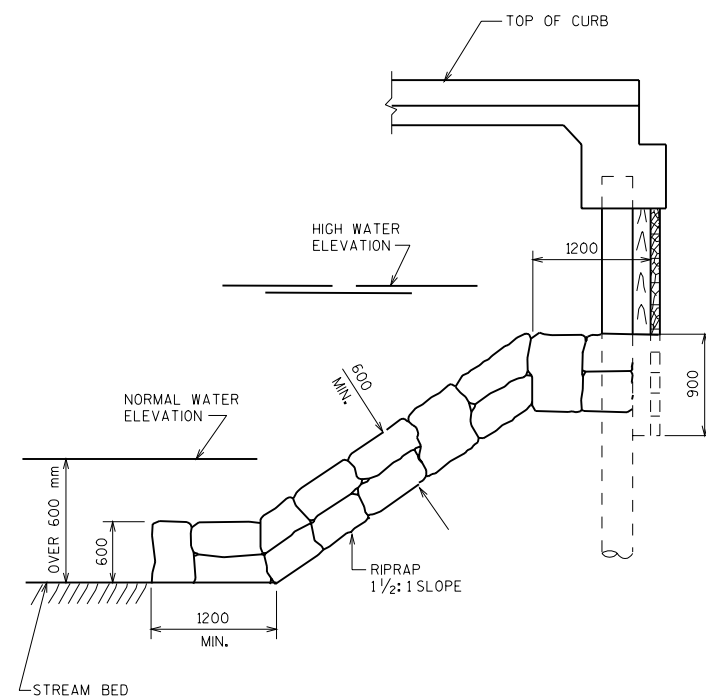


HALF ELEVATION



LONGITUDINAL SECTION WITH BERM

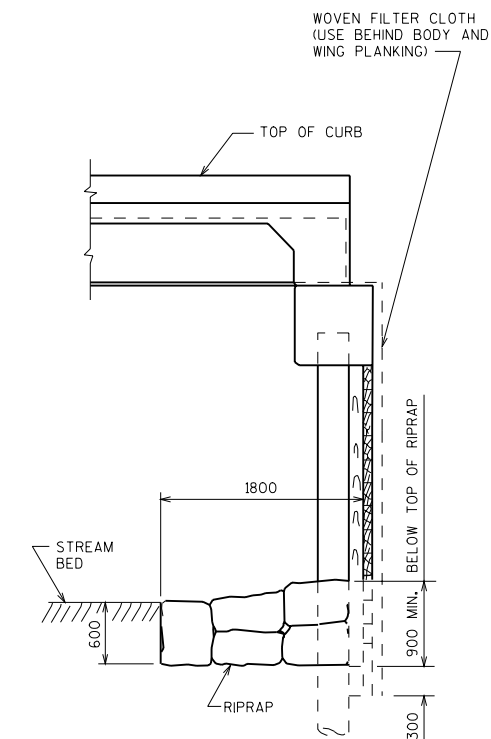
SHOWING TOE OF RIPRAP WHEN WATER IS 600 mm OR LESS IN DEPTH.



LONGITUDINAL SECTION WITH BERM

SHOWING TOE OF RIPRAP WHEN WATER IS OVER 600 mm IN DEPTH.

ALL DIMENSIONS ARE IN MILLIMETERS.

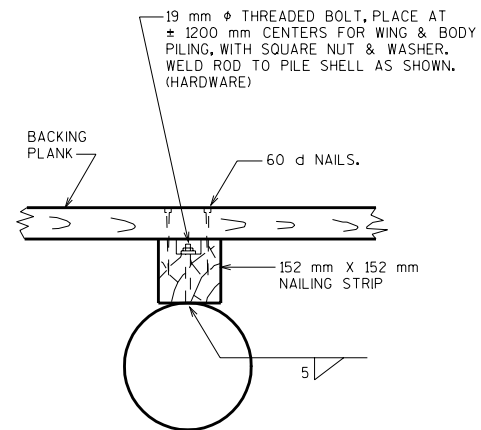


LONGITUDINAL SECTION WITHOUT BERM

TIMBER ABUTMENT

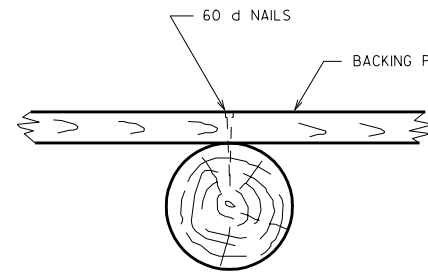
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99

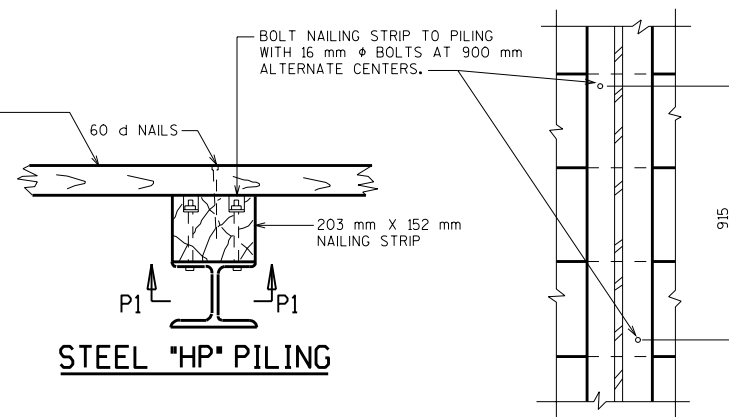


**CONCRETE
CAST-IN-PLACE PILING**

REFER TO STANDARD 11.1 FOR SECTION
THRU REINFORCED CAST-IN-PLACE PILING
WHEN PILES ARE EXPOSED.

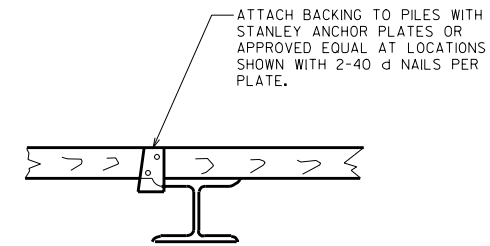


TIMBER PILING



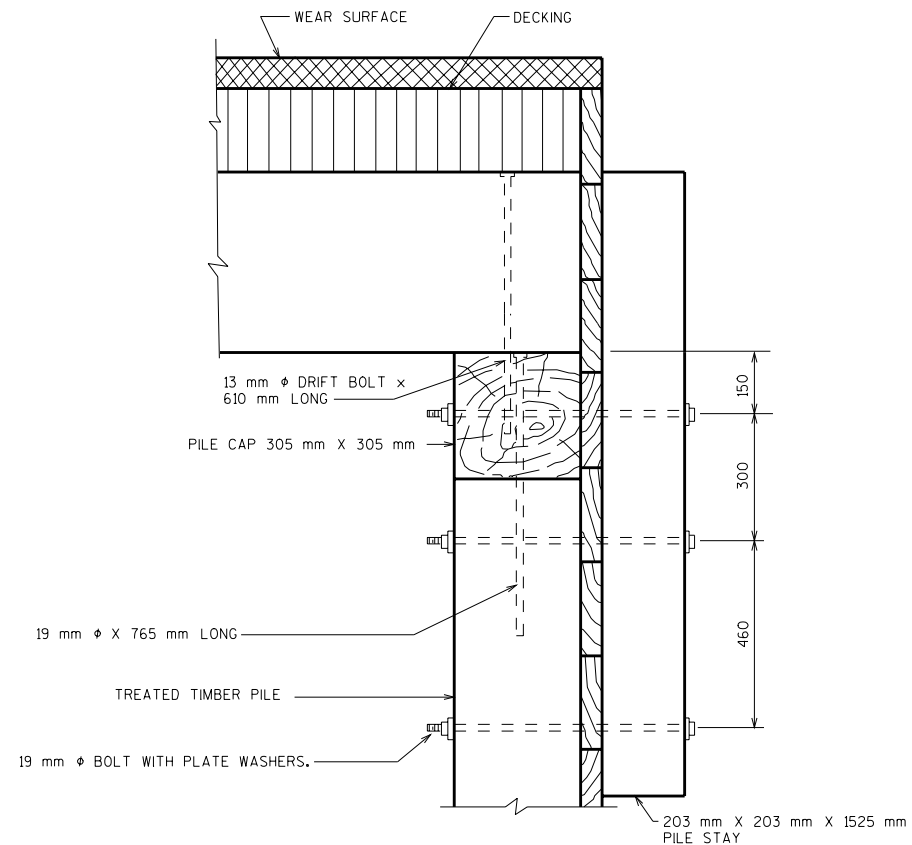
STEEL "HP" PILING

SECTION P1

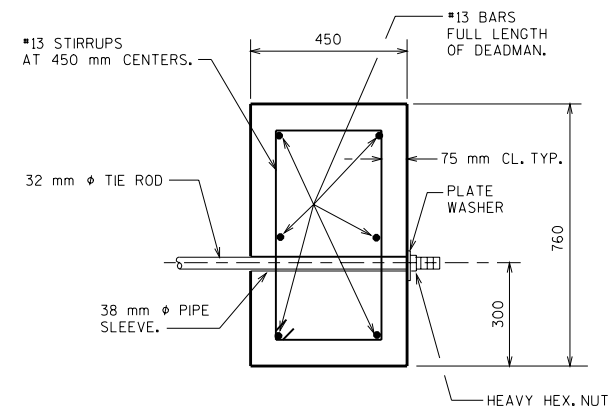


**STEEL "HP" PILING
(ALTERNATE ATTACHMENT)**

BODY & WING PLANK CONNECTION DETAILS



**PILE CAP DETAIL
(TIMBER GIRDER)**



SECTION THRU DEADMAN

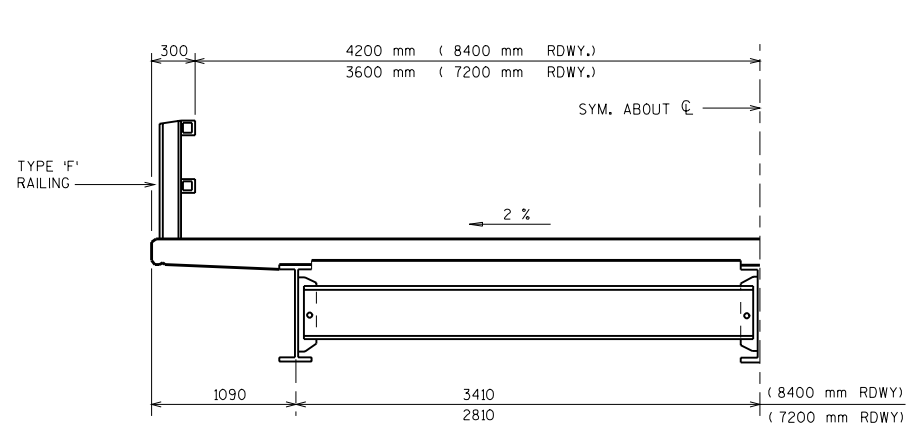
ALL DIMENSIONS ARE IN MILLIMETERS

**TIMBER ABUTMENT
DETAILS**

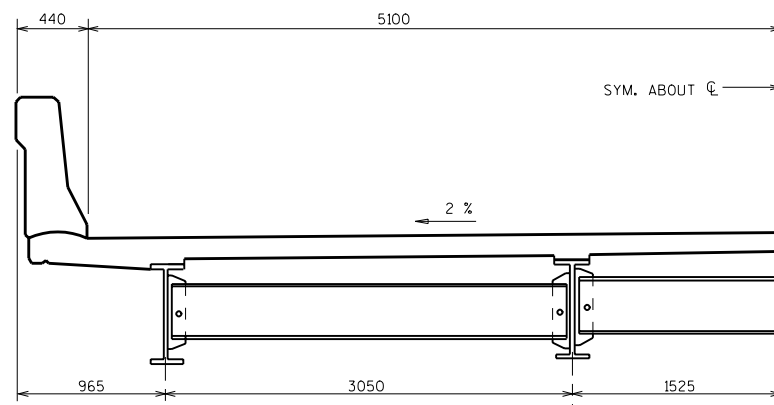
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

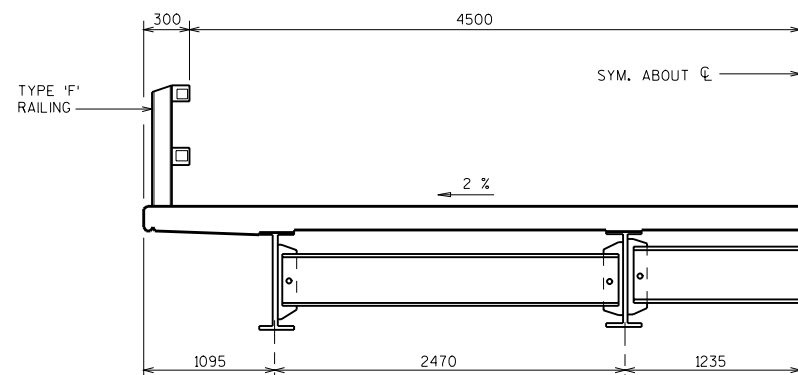
DATE:
1/99



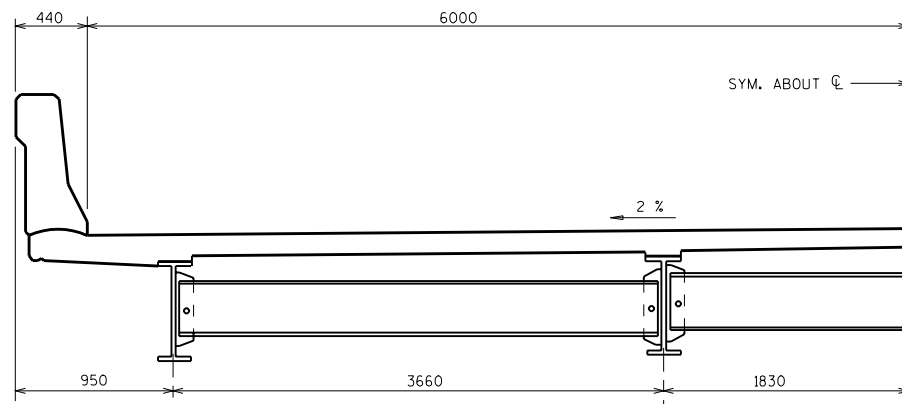
7200 mm & 8400 mm ROADWAY



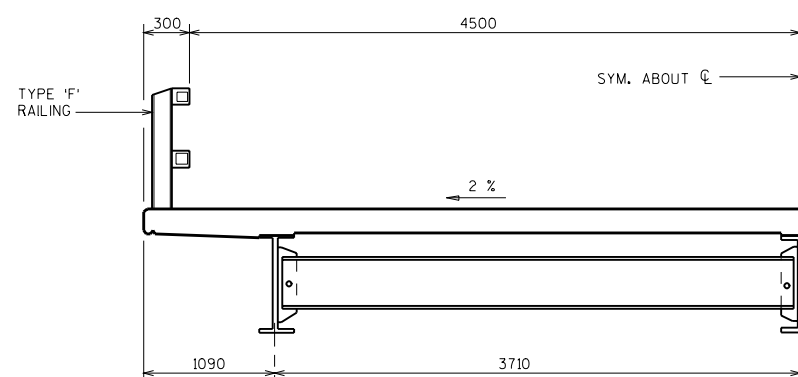
10200 mm ROADWAY



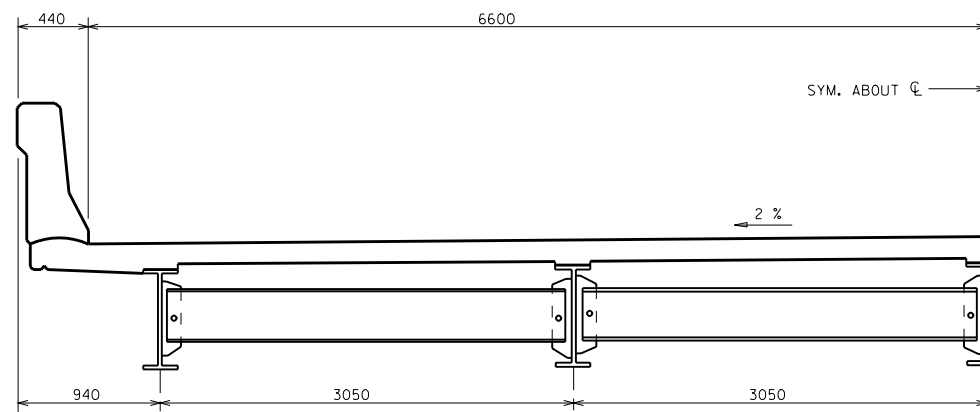
9000 mm ROADWAY



12000 mm ROADWAY



9000 mm ROADWAY



13200 mm ROADWAY

NOTES

GIRDER SPACINGS SHOWN MAY BE MODIFIED BY THE DESIGNER, IF OTHER SPACINGS RESULT IN A MORE ECONOMICAL SECTION.

SEE CHAPTER 17 IN THE BRIDGE MANUAL FOR DECK THICKNESS.

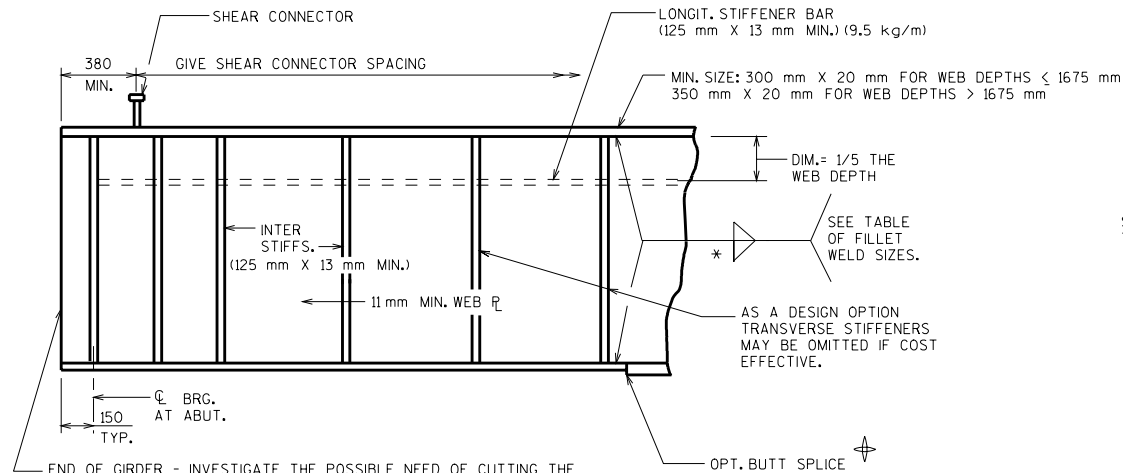
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

**STEEL GIRDER
SUPERSTRUCTURE SECTIONS**

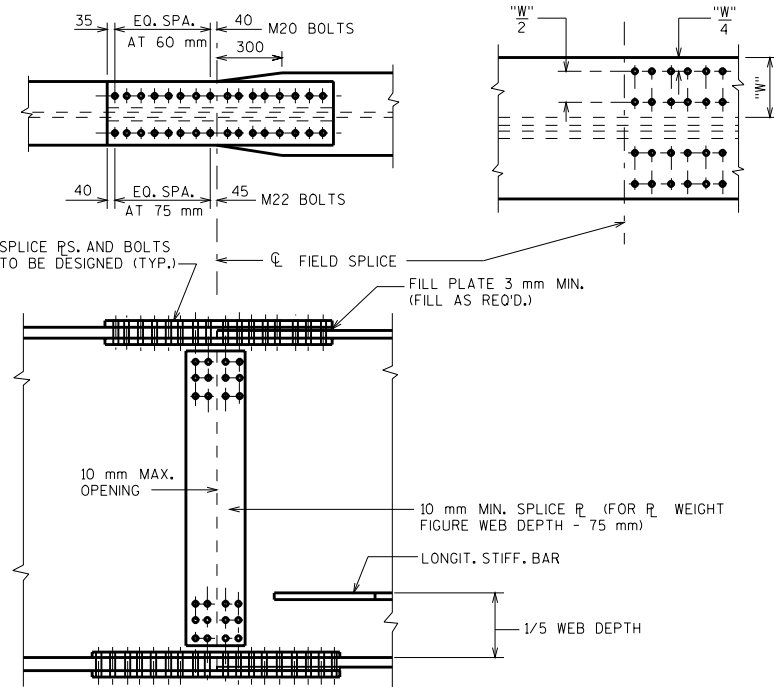
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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APPROVED: _____

DATE:
1/99



PART GIRDER ELEVATION



FIELD SPLICE DETAILS

SEE STANDARD 24.7 FOR KINKED GIRDER DETAILS.

NOTES

OPTIONAL WELDED SHOP SPLICES MAY BE USED FOR ALL FLANGE AND WEB PLATES OVER 18200 mm LONG. IF USED, THE LOCATION OF THE SPLICE SHALL BE SHOWN ON SHOP DRAWINGS AND WILL BE SUBJECT TO THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

OPTIONAL FLANGE BUTT SPLICE. A FLANGE PLATE OF THE LARGER SIZE MAY BE FURNISHED FULL LENGTH, BUT PAY WEIGHT SHALL BE BASED ON SECTIONS AS DETAILED.

(REMINDER - BASE BEARING SEAT ELEVATIONS AT ABUTMENT ON THICKER FLANGE AND DETAIL SHIM PLATES TO ACCOMMODATE THINNER FLANGE.)

AT EXTERIOR GIRDERS PLACE INTERMEDIATE TRANSVERSE STIFFENERS ON INTERIOR FACE OF GIRDER. PLACE LONGITUDINAL STIFFENERS ON THE OUTSIDE FACE.

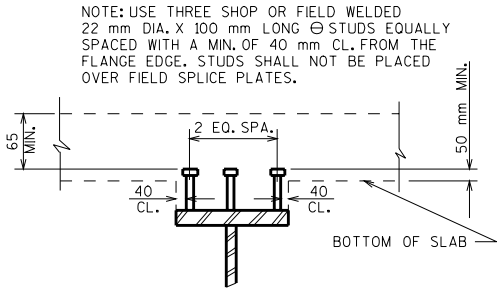
AT INTERIOR GIRDERS PLACE INTERMEDIATE TRANSVERSE STIFFENERS ON ONE SIDE OF GIRDER AND LONGITUDINAL STIFFENERS ON THE OPPOSITE SIDE OF GIRDER. KEEP INTERMEDIATE STIFFENERS ON ONE SIDE WHEN LONGITUDINAL STIFFENERS ARE NOT REQUIRED.

AVOID USE OF LONGITUDINAL STIFFENERS IF PRACTICAL BY THICKENING WEB. WHERE LONGITUDINAL STIFFENERS ARE USED, RUN THEM CONTINUOUS WITHOUT BREAKS AT CONNECTION STIFFENERS.

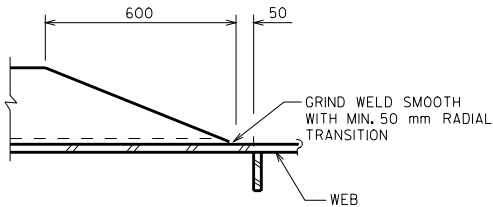
AT EXTERIOR GIRDER PLACE INTERMEDIATE STIFFENERS ALONG ENTIRE LENGTH OF GIRDER AT A MAX. SPACING EQUAL TO 1.5 X THE DEPTH OF WEB. SPACE EQUALLY BETWEEN DIAPHRAGM CONNECTION STIFFENER. THIS REQUIREMENT IS NECESSARY TO SUPPORT THE FALSEWORK FOR THE SLAB OVERHANG AND MAY BE DISREGARDED IF THE SLAB OVERHANG, MEASURED FROM CL. WEB, IS 460 mm OR LESS OR ANY OF THE FOLLOWING CRITERIA ARE SATISFIED:

- ...WEB THICKNESS \geq 16 mm AND WEB DEPTH \leq 1225 mm
- ...WEB THICKNESS \geq 18 mm AND WEB DEPTH \leq 1525 mm
- ...WEB THICKNESS \geq 20 mm AND WEB DEPTH \leq 1675 mm

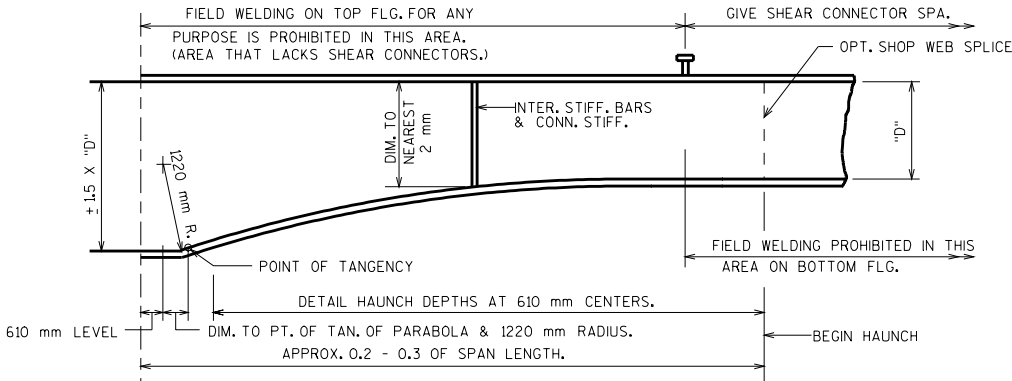
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.



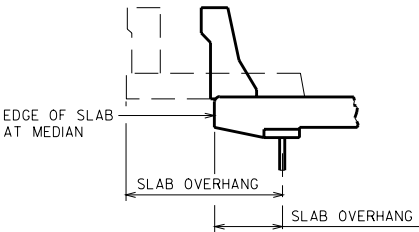
SHEAR CONN. DETAILS



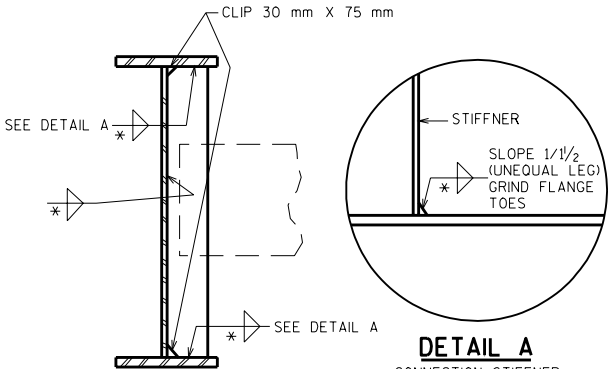
LONGIT. STIFF. TERMINATION



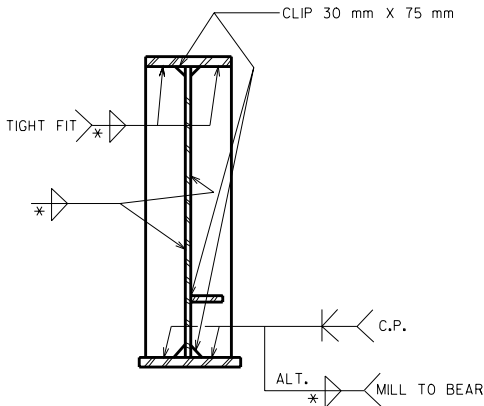
PARABOLIC HAUNCH DETAILS



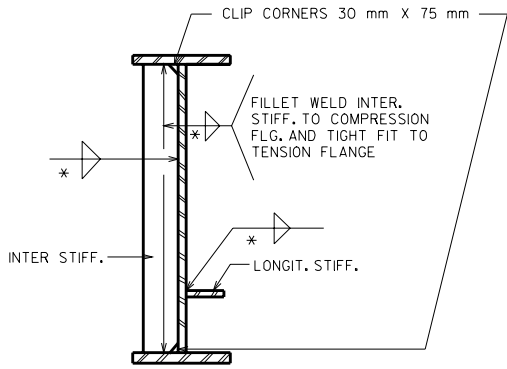
SLAB OVERHANG DEFINITION



CONNECTION STIFF. DETAILS



BRG. STIFF. DETAILS TYP. AT ABUT. & PIER

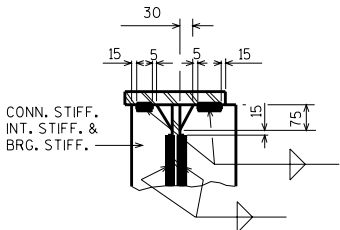


INTERMEDIATE & LONGITUDINAL STIFF. DETAILS (ALL GIRDERS)

* TABLE OF FILLET WELD SIZES

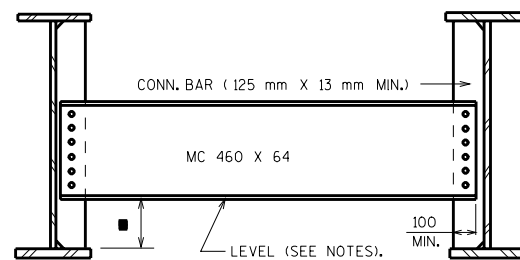
MATERIAL THICKNESS OF THICKER PART JOINED.	MIN. SIZE OF FILLET WELD
TO 12 mm INCLUSIVE	5
OVER 12 mm TO 18 mm	6
OVER 18 mm TO 38 mm	8
OVER 38 mm TO 55 mm	10
OVER 55 mm TO 150 mm	13

EXCEPT THAT THE WELD SIZE SHALL NOT EXCEED THE THICKNESS OF THE THINNER PART JOINED.
MIN. PASS SIZE IS 8

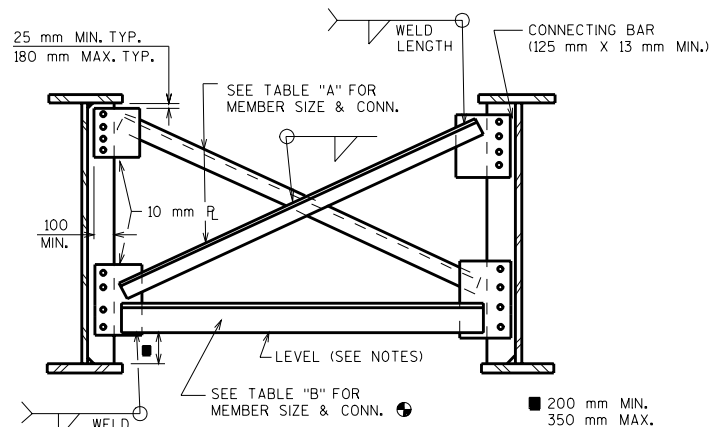


STIFF. & CONN. STIFF. TO WEB/FLANGE CONN. WELDS

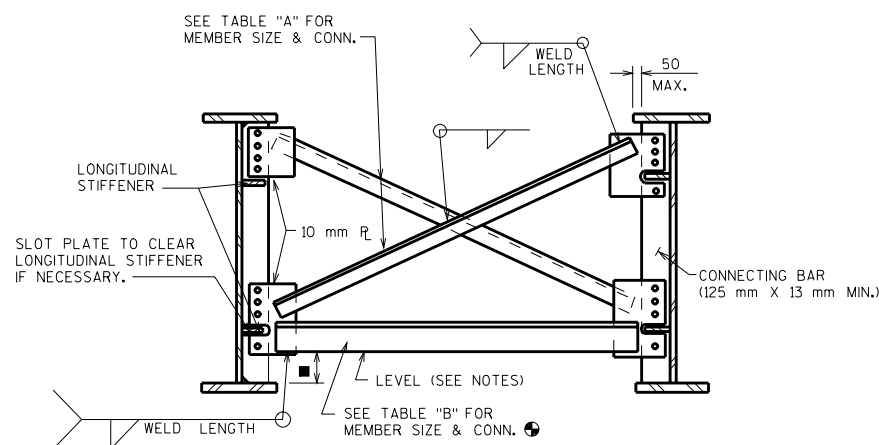
PLATE GIRDER DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 6/02



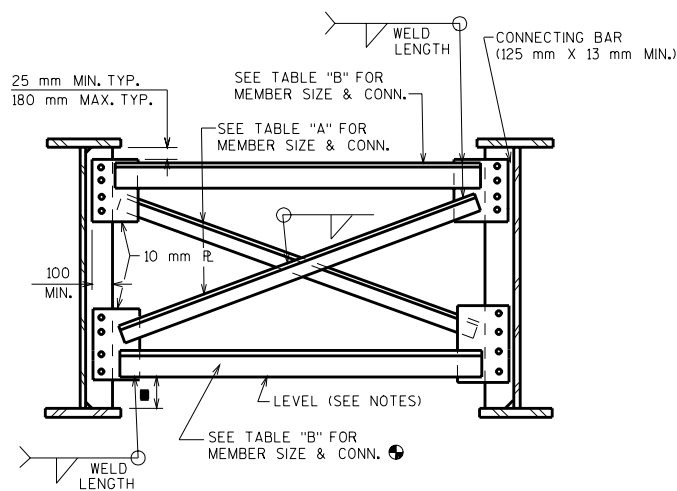
**WEB PLATE \leq 1225 mm
TYP. IN SPAN & AT PIER**



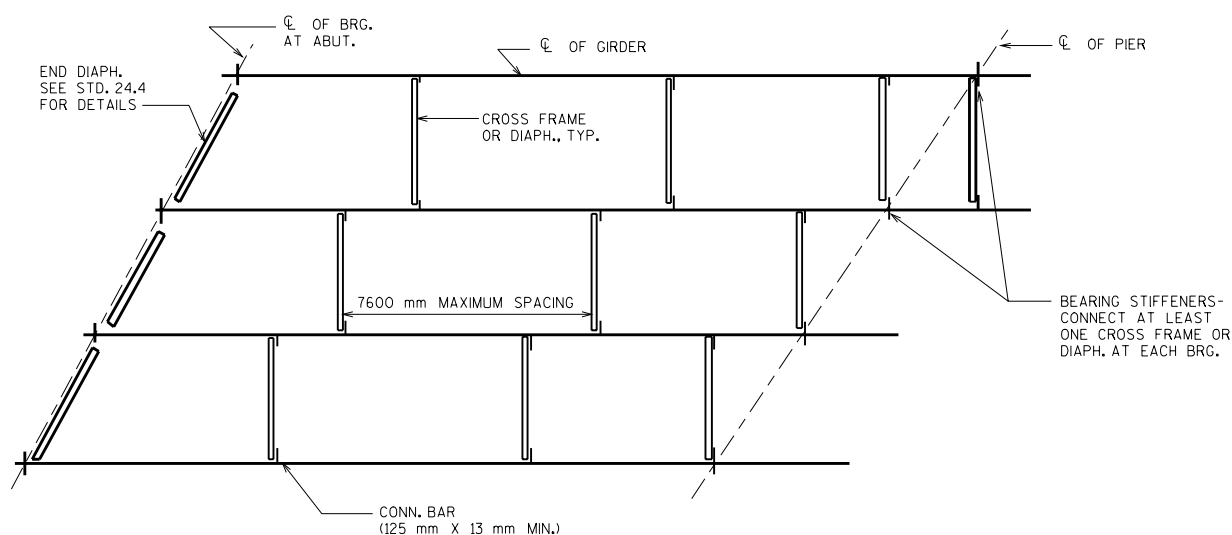
**WEB PLATE OVER 1225 mm
TYP. IN SPAN & AT PIER**



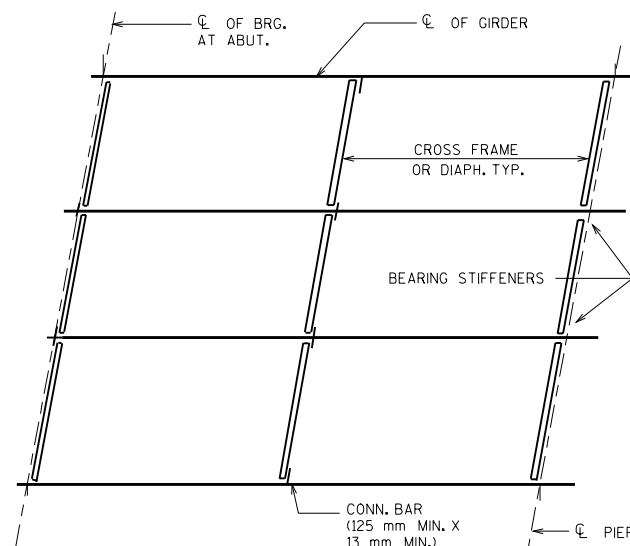
**WEB PLATE OVER 1225 mm WITH LONGITUDINAL STIFFENERS
TYP. IN SPAN & AT PIER**



TYP. CURVED GIRDER DIAPHRAGM
ALSO USE TOP HORIZONTAL MEMBER AT DIAPHRAGMS
ADJACENT TO KINK POINTS OF KINKED GIRDERS



FRAMING PLAN FOR SKEW $> 15^\circ$



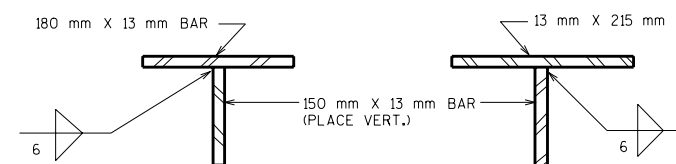
FRAMING PLAN FOR SKEW $\leq 15^\circ$

TABLE "A"

SIZE	MAX. LENGTH OF MEMBER	WELD LENGTH	NO. OF M20 BOLTS	WEIGHT PER m
L 89 X 89 X 7.9	6550	230	4	10.7 kg.
L 102 X 102 X 7.9	7620	280	4	12.2 kg.
L 127 X 127 X 7.9	9450	355	5	15.3 kg.

TABLE "B"

SIZE	MAX. LENGTH OF MEMBER	WELD SIZE	WELD LENGTH	NO. OF M20 BOLTS	WEIGHT PER m
L 127 X 127 X 7.9	3500	6	280	4	15.3 kg.
L 152 X 152 X 9.5	4100	8	330	6	22.2 kg.
13 mm T SECTION SEE DETAIL "A"	5330	8	355	7	24.7 kg
13 mm T SECTION SEE DETAIL "B"	6700	10	330	7	27.5 kg



DETAIL "A"

DETAIL "B"

NOTE: WT 155 X 37 MAY BE SUBSTITUTED FOR DETAIL "A" OR "B".

NOTES

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE USING M20 HIGH STRENGTH BOLTS (A.S.T.M. A325M) WITH DOUBLE WASHERS.

FOR SPANS OVER 60960 mm, THE CROSS FRAMES AT THE PIERS SHALL BE DESIGNED TO RESIST THE LATERAL LOADS THAT ARE TRANSFERRED TO THE PIERS.

DIAPHRAGMS OR LOWER CROSS FRAME MEMBERS ARE SLOPED WHEN DIFFERENCE IN ADJACENT BOTTOM FLANGE ELEVATIONS EXCEEDS 150 mm. HOLD 200 mm FROM TOP OF ADJACENT FLANGES TO BOTTOM OF DIAPHRAGMS OR LOWER CROSS FRAME WHEN THESE MEMBERS ARE SLOPED.

DIAPHRAGMS OR LOWER CROSS FRAME MEMBERS THAT ARE LEVEL SHALL BE PLACED 200 mm ABOVE THE TOP OF THE HIGHER BOTTOM FLANGE OF ADJACENT GIRDERS.

HOLES IN CROSS FRAME CONNECTIONS MAY BE OVERSIZED ϕ 24 mm DIA. IN 1 PLY.

HORIZONTAL CROSSFRAME MEMBER TO HAVE HORIZONTAL LEG TOP (AS SHOWN) WHEN NO LOWER LATERALS ARE USED. WHEN LOWER LATERALS ARE USED THE HORIZONTAL LEG SHALL BE ON THE BOTTOM, THIS IS TO ALLOW FRAMING INTO THE LOWER LATERAL GUSSET.

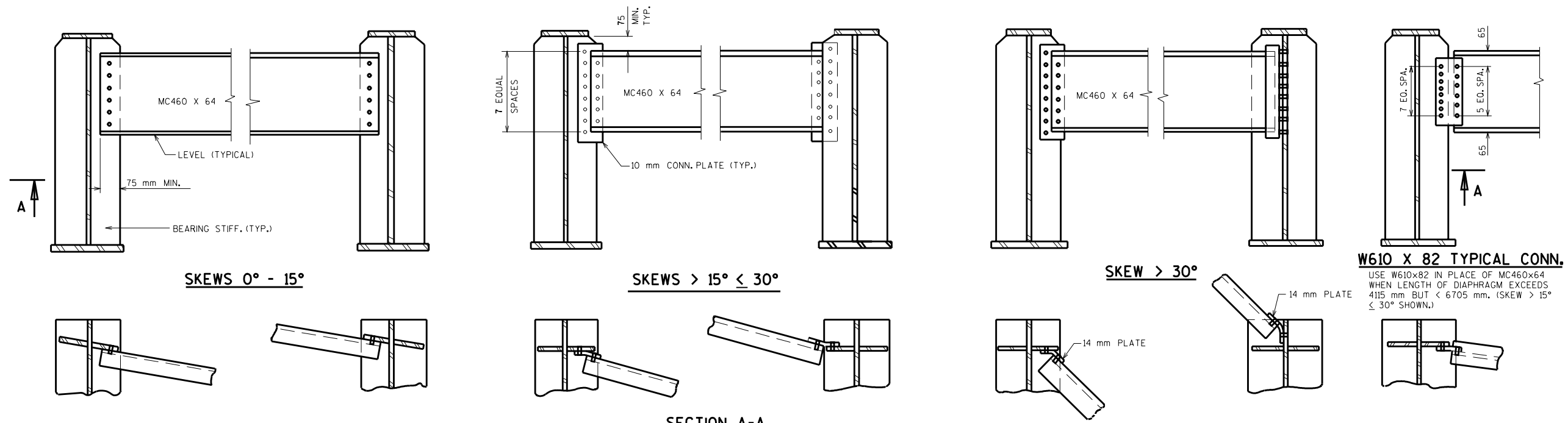
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

PLATE GIRDER DIAPHRAGMS AND CROSS FRAMES

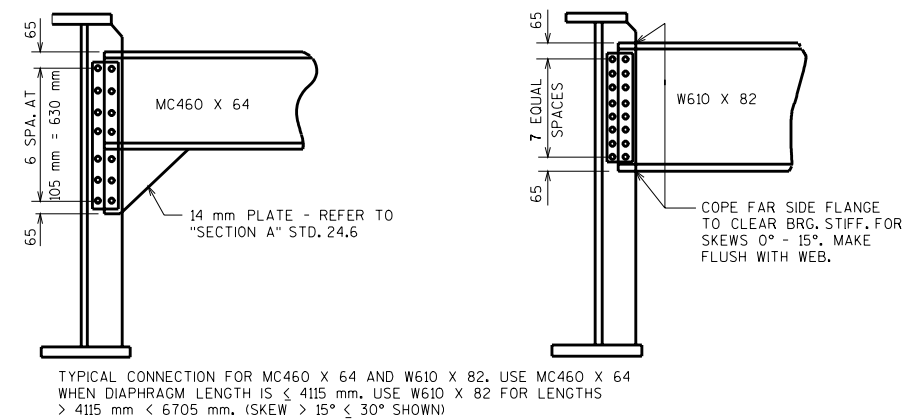
STATE OF WISCONSIN
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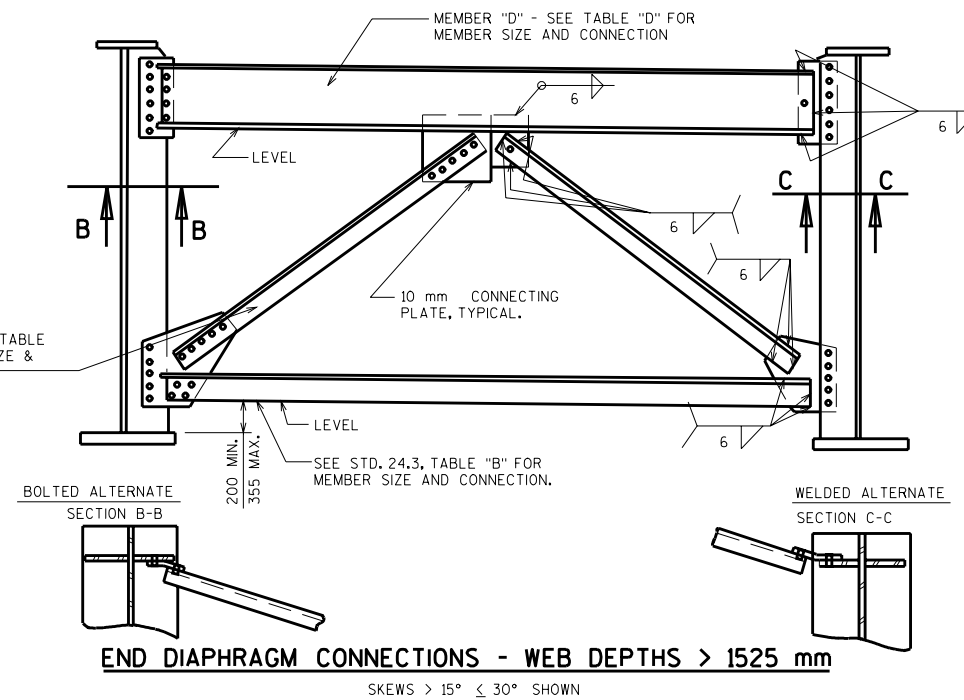
DATE:
1/03



END DIAPHRAGM CONNECTIONS - WEB DEPTHS ≤ 1225 mm



END DIAPHRAGM CONNECTIONS - WEB DEPTHS > 1225 mm ≤ 1525 mm



NOTES

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE MADE WITH M20 HIGH STRENGTH BOLTS. (A.S.T.M. A325M)

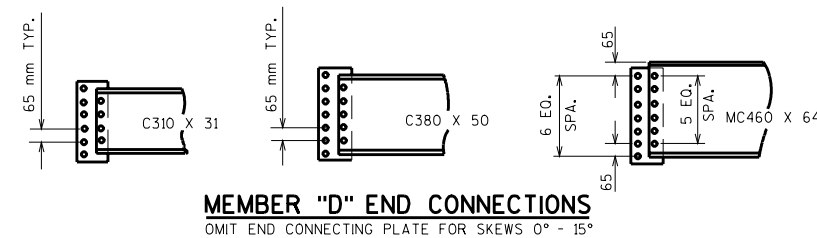
FOR WEB DEPTHS GREATER THAN 1525 mm, THE NUMBER OF BOLTS REQUIRED BETWEEN BEARING STIFFENERS AND LOWER CONNECTING PLATES EQUALS THE NUMBER OF BOLTS REQUIRED IN MEMBER "C" OR THE NUMBER REQUIRED IN THE LOWER HORIZONTAL MEMBER, WHICHEVER IS GREATER.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

TABLE "D"

MEMBER "C"	WEB DEPTH									MEMBER	MEMBER "D" CONN.	
	1525 - 1975			1975 - 2275			2275 - 2675				NO. OF M20 BOLTS	
	MEMBER "C" SIZE	NO. OF M20 BOLTS	LENGTH OF 6 mm WELD	MEMBER "C" SIZE	NO. OF M20 BOLTS	LENGTH OF 6 mm WELD	MEMBER "C" SIZE	NO. OF M20 BOLTS	LENGTH OF 6 mm WELD		"D" SIZE	CONN. PLATE TO BRG. STIFF.
MAXIMUM LENGTH												
3505	102 X 102 X 7.9	5	330	102 X 102 X 7.9	5	305	102 X 102 X 7.9	5	280	C310 X 31	6 @ 65 mm	4 @ 65 mm
4115	127 X 127 X 7.9	6	430	127 X 127 X 7.9	6	405	127 X 127 X 7.9	6	380	C310 X 31	6 @ 65 mm	4 @ 65 mm
5330	152 X 152 X 7.9	8	510	127 X 127 X 7.9	7	455	127 X 127 X 7.9	6	405	C380 X 50	7 @ 65 mm	5 @ 65 mm
6705	152 X 152 X 7.9	9	585	152 X 152 X 7.9	8	535	152 X 152 X 7.9	7	485	MC460 X 64	7 @ 65 mm	6 @ 65 mm

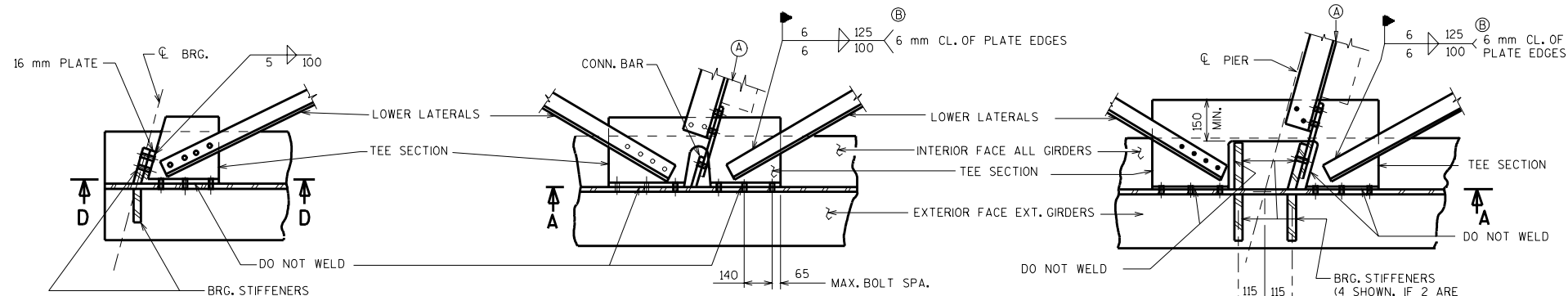
NOTE: ALL MEMBER "C" SIZES REPRESENT ANGLES.



END DIAPHRAGMS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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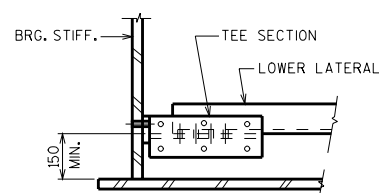
APPROVED: _____ DATE: 1/99



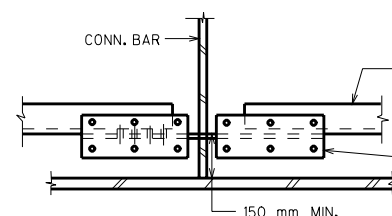
AT ABUTMENT

IN SPAN

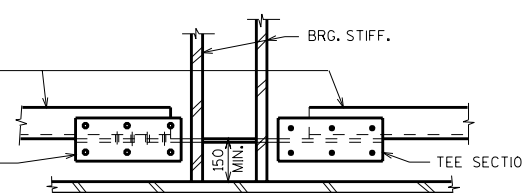
AT PIER



SECTION D

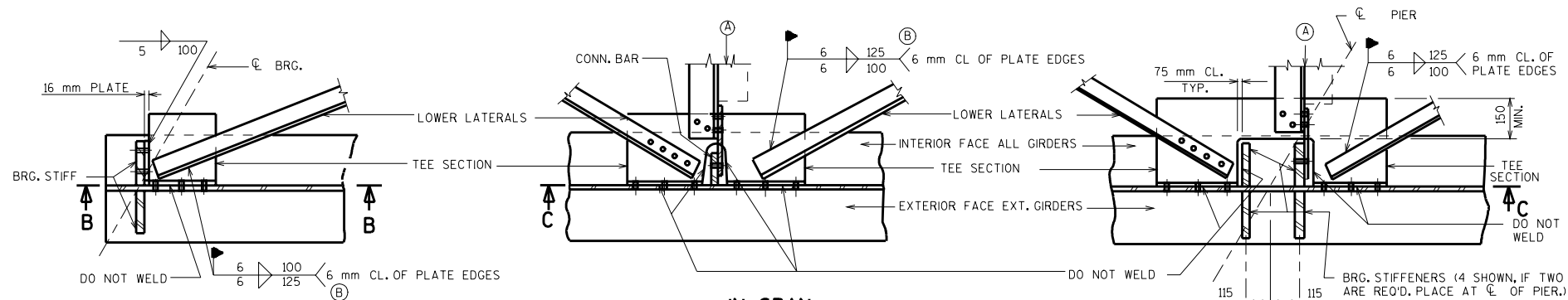


SECTION A & C



SECTION A & C

CONNECTION DETAILS FOR SKEWS $\leq 15^\circ$

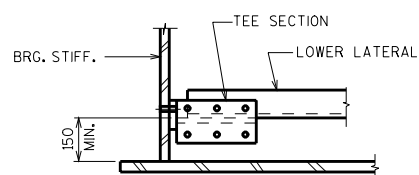


AT ABUTMENT

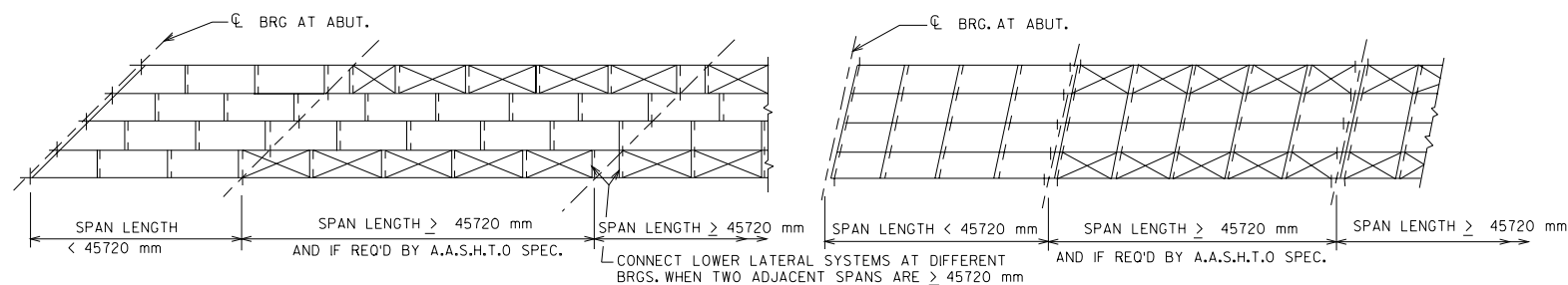
IN SPAN

AT PIER

CONNECTION DETAILS FOR SKEWS $> 15^\circ$



SECTION B



SKEW $> 15^\circ$

SKEW $\leq 15^\circ$

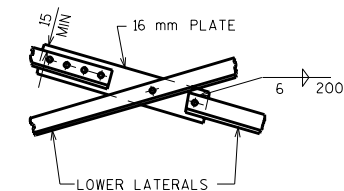
PLAN VIEW SHOWING LOWER LATERAL LOCATIONS

NOTES

Ⓐ ANGLE OR BUILT-UP SECTION FROM TABLE B, STANDARD 24.3. THE TEE SECTION FOR THE LOWER LATERAL CONNECTION MAY BE PLACED ABOVE THIS MEMBER WHEN THIS MEMBER IS SLOPED.

PLACE EACH PANEL OF LOWER LATERALS IN ONE PLANE. PANELS MUST BE HORIZONTAL IN THE TRANSVERSE DIRECTION ONLY.

LOWER LATERALS WHEN REQ'D IN SPANS OF 45720 mm OR GREATER, PLACE IN EXTERIOR BAYS.



USE L 102 X 76 X 7.9 WITH 265 mm LENGTH OF 6 mm WELD OR 4-M20 HIGH STRENGTH FRICTION TYPE BOLTS FOR MAX. LOWER LATERAL LENGTH OF 7925 mm. (PLACE 102 mm LEG VERT.) (WT. = 10.7 kg/m)

USE L 127 X 89 X 7.9 WITH 320 mm LENGTH OF 6 mm WELD OR 4-M20 HIGH STRENGTH FRICTION TYPE BOLTS FOR MAX. LOWER LATERAL LENGTH OF 9295 mm (PLACE 127 mm LEG VERT.) (WT. = 12.9 kg/m)

LOWER LATERAL CONNECTION STEMS SHALL BE AS CLOSE TO THE BOTTOM GIRDER FLANGE (BUT NO CLOSER THAN 150 mm PLUS PLATE THICKNESS) AS FEASIBLE. THIS APPLIES TO BOTH HAUNCHED AND PARALLEL FLANGE GIRDERS.

ALL AREAS SUBJECT TO FIELD WELDS SHALL BE PROTECTED BY WELDABLE RUST PROOF COATINGS PRIOR TO WELDING.

LOWER LATERAL SHELFs TO BE PROVIDED BY TEE SECTION CUT FROM PREFERABLY WT 305 X 50.5 IN SPAN AND WT 380 X 73.5 AT PIERS, OR FABRICATE WITH EQUIVALENT PLATES.

IN REGARD TO LOWER LATERALS THE DESIGNER IS ADVISED TO CONSIDER CHANGES OF PLATE SIZES OR DIAPHRAGM SPACING TO OMIT LOWER LATERAL BRACING.

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE USING M20 HIGH STRENGTH BOLTS (ASTM A325M) WITH DOUBLE WASHERS. OVERSIZED HOLES 24 mm ϕ MAY BE USED IN LOWER LATERAL BRACING COMPONENTS IN 1 PLY.

Ⓑ FIELD WELDS ALLOWED ONLY ON UNPAINTED STEEL AT DESIGNATED STREAM CROSSINGS.

Ⓒ PREFERABLY SINGLE BEARING STIFFENER PAIRS SHALL BE USED AT PIERS.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

LOWER LATERAL DETAILS

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1/99

INTERMEDIATE DIAPHRAGM SIZES

ALL INTERMEDIATE CONNECTIONS	
GIRDER DEPTH	INTERMEDIATE DIAPHRAGMS
920	MC460 X 64
840	MC460 X 64
760	C380 X 50
690	C380 X 50
610	C310 X 31
530	C250 X 23
460	C200 X 17

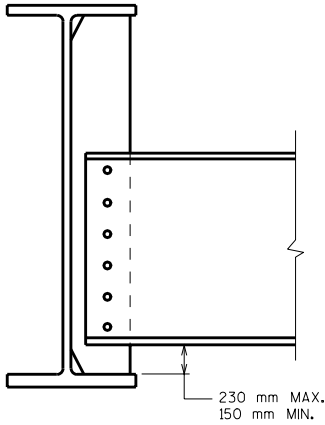
NOTES
DIAPHRAGMS SHALL BE HORIZONTAL EXCEPT WHEN THE DIFFERENCE IN ADJACENT GIRDER ELEVATIONS IS OF A MAGNITUDE THAT NECESSITATES SLOPING THE DIAPHRAGMS.

WHEN DIAPHRAGMS ARE SLOPED, PLACE CENTER OF DIAPHRAGM AT MID-DEPTH OF GIRDER.

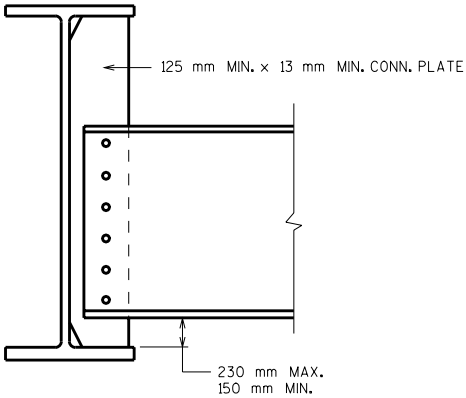
ALL BOLTED CONNECTIONS SHALL BE MADE WITH M20 HIGH STRENGTH BOLTS. (A.S.T.M. A325M)

FOR CONNECTION BAR CORNER CLIPS & WELD DETAILS SEE "CONNECTION STIFFENER DETAILS" ON STD. 24.2

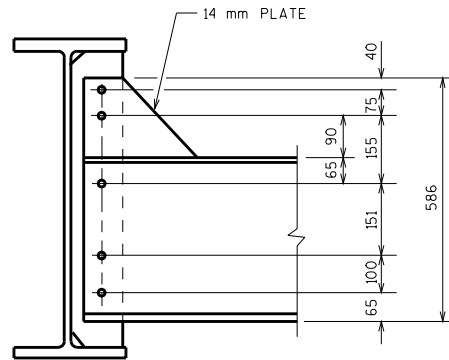
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.



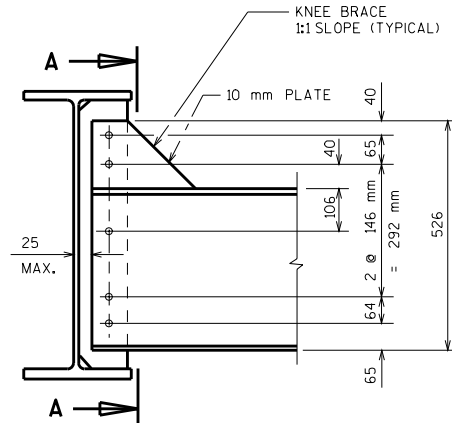
920 mm W. GIRDER



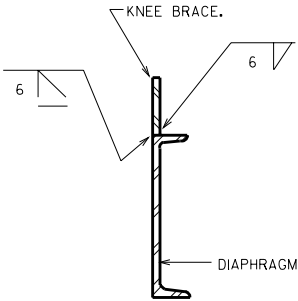
840 mm W. GIRDER



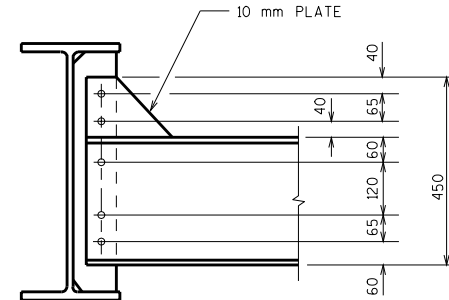
760 mm W. GIRDER



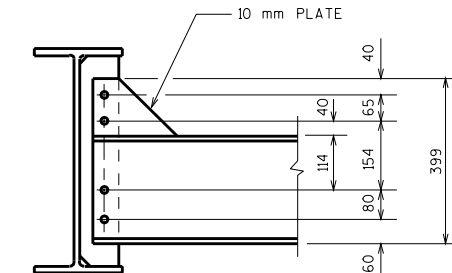
690 mm W. GIRDER



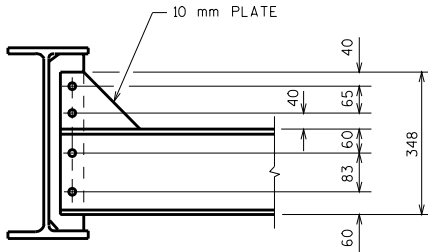
SECTION A



610 mm W. GIRDER



530 mm W. GIRDER



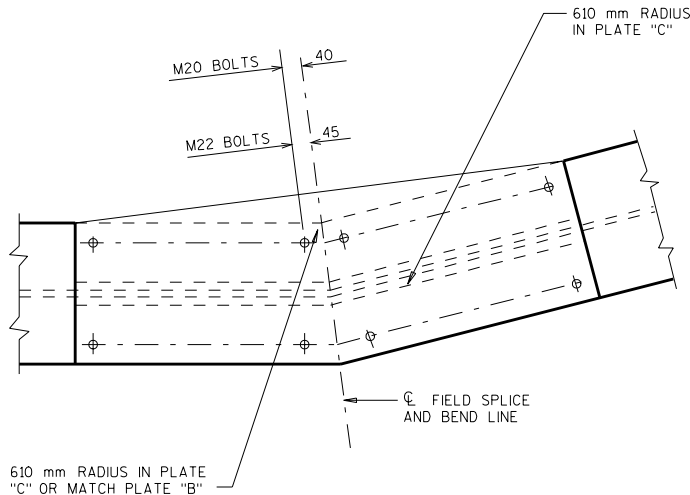
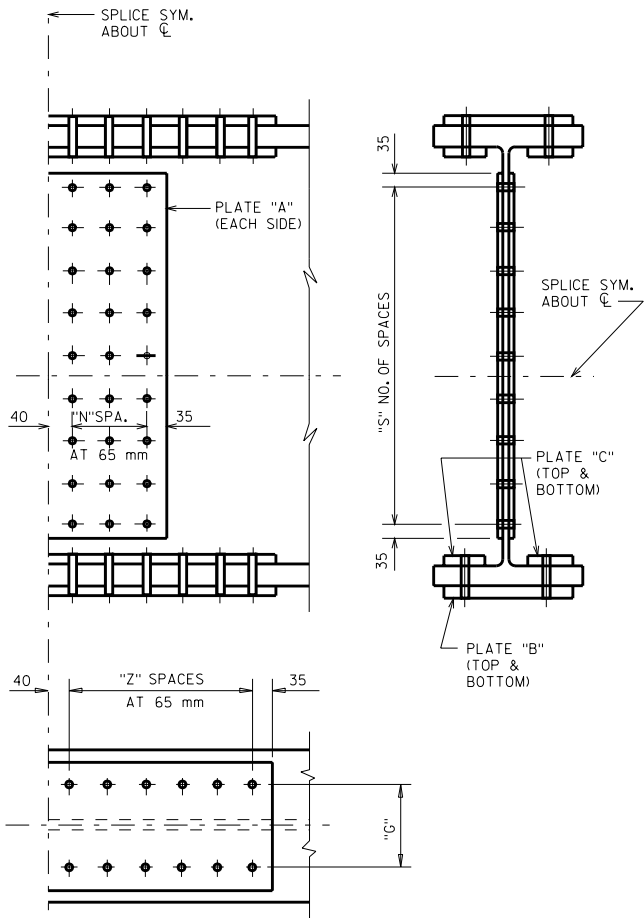
460 mm W. GIRDER

ROLLED GIRDER DIAPHRAGMS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 6/02

GIRDERS OF A709M GRADE 250 STEEL

GIRDERS OF A709M GRADE 345/A709M GRADE 345W STEEL

SECTION		WEB SPLICE			FLANGE SPLICE				MOMENT CAPACITY OF SPLICE kN • m	WEIGHT OF SPLICE kg	WEB SPLICE			FLANGE SPLICE				MOMENT CAPACITY OF SPLICE kN • m	WEIGHT OF SPLICE kg
		"N"	"S"	PLATE "A"	"Z"	"G"	PLATE "B"	PLATE "C"			"N"	"S"	PLATE "A"	"Z"	"G"	PLATE "B"	PLATE "C"		
W 610	101	1	6	280 X 10	3	130	205 X 10 X 540	75 X 10 X 540	244	60	2	6	410 X 10	4	130	220 X 11 X 670	90 X 14 X 670	366	90
	113	1	6	280 X 10	3	130	205 X 10 X 540	75 X 14 X 540	278	65	2	6	410 X 10	4	130	220 X 11 X 670	90 X 14 X 670	366	95
	125	1	7	280 X 10	4	140	230 X 10 X 670	90 X 11 X 670	305	75	2	6	410 X 10	5	130	220 X 14 X 800	90 X 14 X 800	380	105
W 690	125	1	8	280 X 10	4	140	230 X 10 X 670	90 X 10 X 670	332	75	2	7	410 X 10	5	130	220 X 14 X 800	90 X 14 X 800	447	115
	140	2	5	410 X 10	4	140	230 X 10 X 670	90 X 14 X 670	386	95	2	8	410 X 10	6	140	230 X 14 X 930	90 X 16 X 930	515	140
W 760	147	2	7	410 X 10	4	140	230 X 10 X 670	90 X 14 X 670	434	100	2	9	410 X 11	6	150	240 X 14 X 930	90 X 16 X 930	583	145
	161	2	7	410 X 10	5	140	230 X 11 X 800	90 X 14 X 800	473	115	3	7	540 X 11	6	165	255 X 14 X 930	90 X 20 X 930	650	170
	173	2	7	410 X 10	5	150	240 X 11 X 800	90 X 16 X 800	522	120	3	7	540 X 11	7	165	255 X 14 X 1060	90 X 20 X 1060	692	195
	185	2	7	410 X 10	5	165	255 X 11 X 800	90 X 20 X 800	576	130	3	7	540 X 11	7	150	255 X 14 X 1060	105 X 20 X 1060	746	200
	196	2	8	410 X 10	6	165	255 X 14 X 930	90 X 20 X 930	610	150	3	8	540 X 11	8	150	255 X 16 X 1190	105 X 20 X 1190	786	225
W 840	176	2	8	410 X 10	5	150	255 X 11 X 800	105 X 14 X 800	597	125	3	8	540 X 11	7	180	280 X 14 X 1060	105 X 16 X 1060	773	200
	193	2	8	410 X 10	5	150	255 X 11 X 800	105 X 16 X 800	651	135	3	8	540 X 11	8	180	280 X 16 X 1190	105 X 16 X 1190	867	230
	210	2	8	410 X 10	6	180	280 X 11 X 930	105 X 16 X 930	698	150	3	9	540 X 11	9	165	280 X 16 X 1320	115 X 20 X 1320	970	270
	226	2	9	410 X 10	7	180	280 X 14 X 1060	105 X 20 X 1060	786	180	3	9	540 X 11	10	165	280 X 16 X 1450	115 X 22 X 1450	1037	305
W 920	201	2	9	410 X 10	6	180	280 X 11 X 930	105 X 14 X 930	718	145	3	10	540 X 11	8	165	280 X 14 X 1190	115 X 16 X 1190	970	235
	223	2	10	410 X 10	7	180	280 X 14 X 1060	105 X 16 X 1060	813	175	3	10	540 X 11	9	165	280 X 16 X 1320	115 X 20 X 1320	1091	275
	238	2	10	410 X 10	7	180	280 X 14 X 1060	105 X 20 X 1060	875	190	3	11	540 X 14	10	165	280 X 16 X 1450	115 X 22 X 1450	1160	310
	253	2	11	410 X 10	8	180	280 X 14 X 1190	105 X 20 X 1190	936	210	3	11	540 X 14	11	165	280 X 20 X 1580	115 X 22 X 1580	1261	355



SPLICE DETAIL FOR KINKED GIRDERS

DESIGN CRITERIA

THE SPLICE IS DESIGNED WITH A CAPACITY OF 80% OF THE STRENGTH OF THE NET SECTION OF THE SMALLER MEMBER BEING JOINED. CHECK MOMENT CAPACITY OF SPLICE WITH EXISTING CONDITIONS.

THE NET SECTION IS TAKEN THRU THE GIRDER WHERE ONLY THE FLANGE CONNECTORS OCCUR. THE SHEAR CAPACITY IS BASED ON THE "T" DEPTH AS GIVEN IN THE A.I.S.C. HANDBOOK.

ALL SPLICE DESIGNS ARE BASED ON M20 HIGH STRENGTH BOLTS IN A CONNECTION.

ALL SPLICE PLATES ARE MADE OF STEEL CONFORMING TO A.S.T.M. SPECIFICATIONS FOR A709M GRADE 250.

THE ALLOWABLE STRESSES USED IN THE DESIGN ASSUMING NO ALTERNATING STRESSES (A.A.S.H.T.O. LOADING COND. NO. 1) ARE:

A709M GRADE 250	A709M GRADE 345/A709M GRADE 345W
BENDING: 138 MPa	190 MPa
SHEAR: 83 MPa	114 MPa

THESE STRESSES ARE APPLIED TO ALL SECTIONS REGARDLESS OF THICKNESS.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

ROLLED GIRDER SPLICE DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99

NOTES

⊗ FOR WELDING DETAILS SEE "CONNECTION STIFFENER DETAILS" ON STANDARD 24.2 MINIMUM PLATE SIZE SHOWN. DESIGN ACTUAL SIZE REQUIRED.

STIFFENERS AND BEARING PLATES ARE ALL PERPENDICULAR TO FLANGES. ANGLES ARE PARALLEL TO FLANGES.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

DESIGNER NOTES

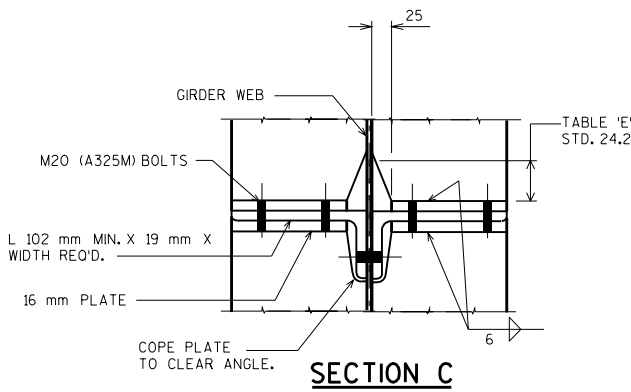
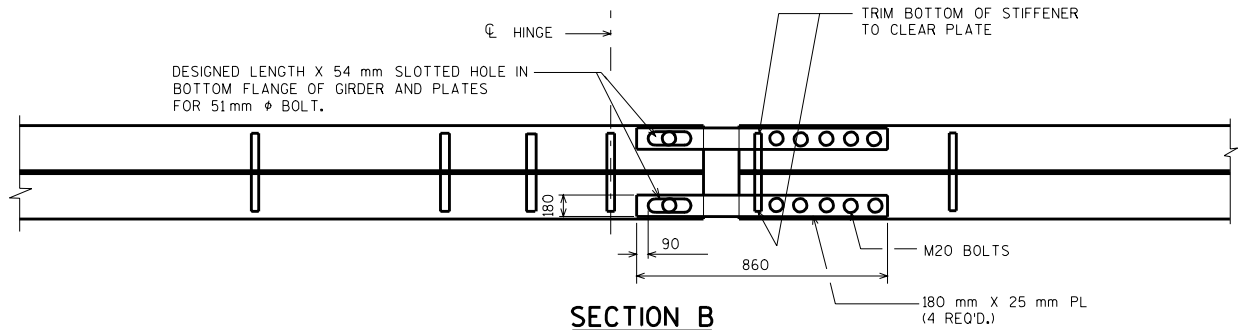
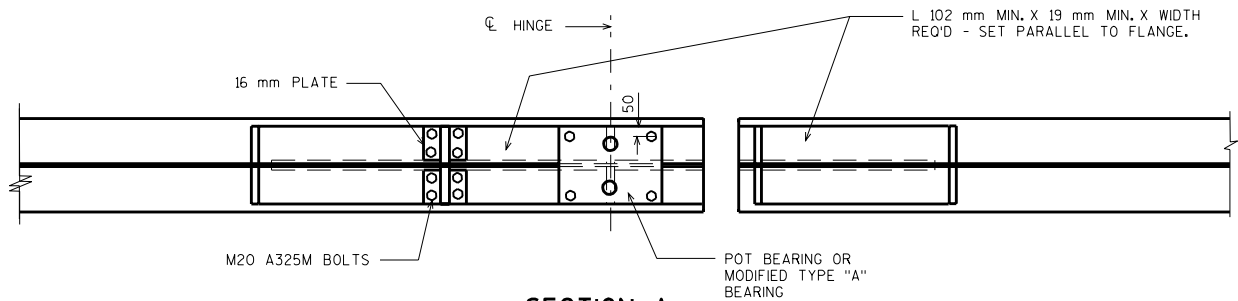
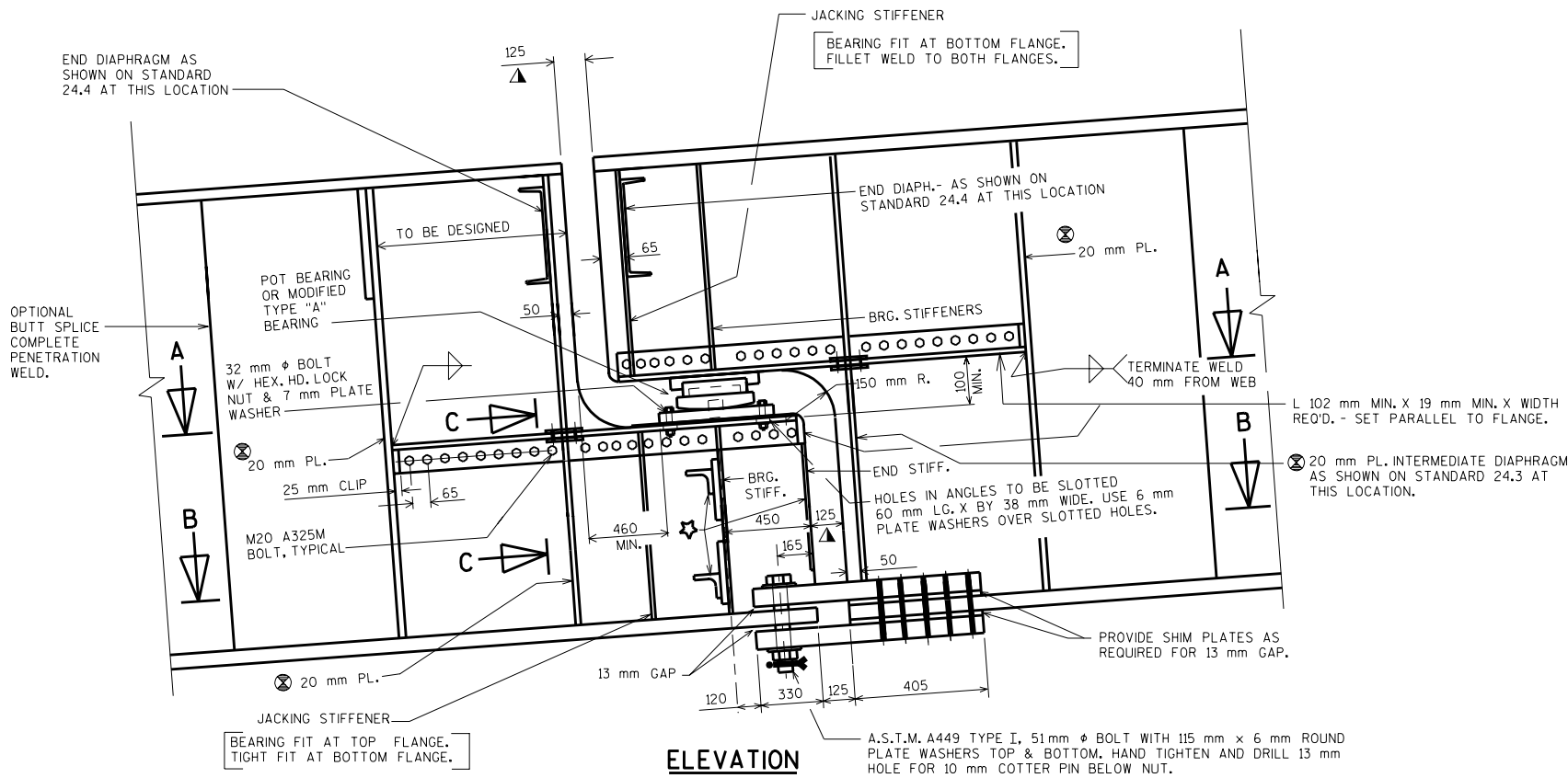
SIZE AND LENGTH OF ANGLES, NUMBER OF BOLTS THRU ANGLES, THICKNESS OF WEB PLATE, AND SIZE OF BEARING STIFFENERS AND JACKING STIFFENERS SHALL BE DETERMINED FROM AN ANALYSIS USING THE VERTICAL AND HORIZONTAL FORCES ACTING AT THE HINGE.

▲ THE 125 mm OPENING BETWEEN GIRDER WEB AND FLANGE PLATES IS FOR FABRICATION ACTUAL OPENING IS BASED ON EXPANSION LENGTH AND TEMPERATURE.

SLOTTED HOLES OF 150 mm IN THE FLANGES AND CONNECTING BARS WILL ACCOMMODATE A TOTAL TEMPERATURE MOVEMENT OF 200 mm (± 100 mm FROM 7° C). THE DESIGNER MAY NEED TO INCREASE OR DECREASE THE LENGTH OF THE SLOT TO MEET SPECIFIC JOB REQUIREMENTS.

☆ CROSS FRAME UNDER BRG. AND END STIFFENER IS ONLY REQ'D. IF TOTAL WEB HEIGHT EXCEEDS 2500 mm.

SEE BRIDGE MANUAL, SECTION 24.1 FOR CRITERIA FOR LOCATING HINGE JOINTS.



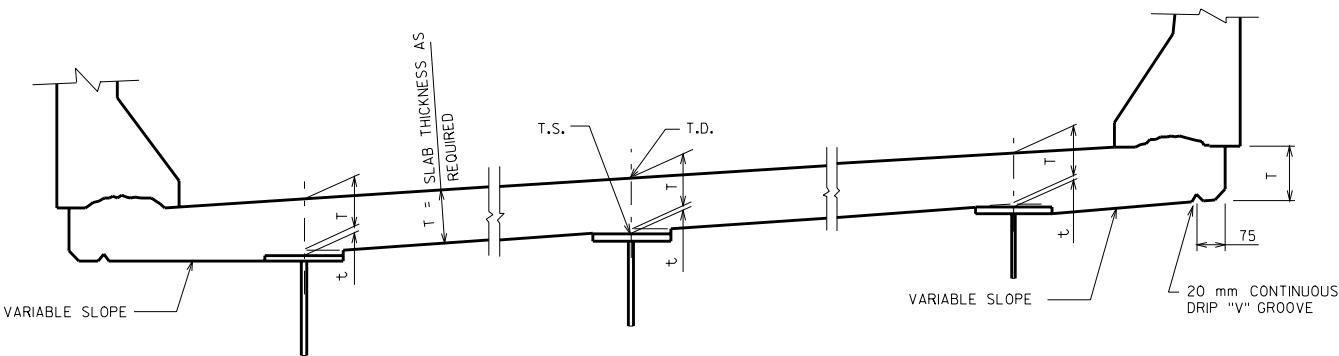
EXPANSION HINGE JOINT DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

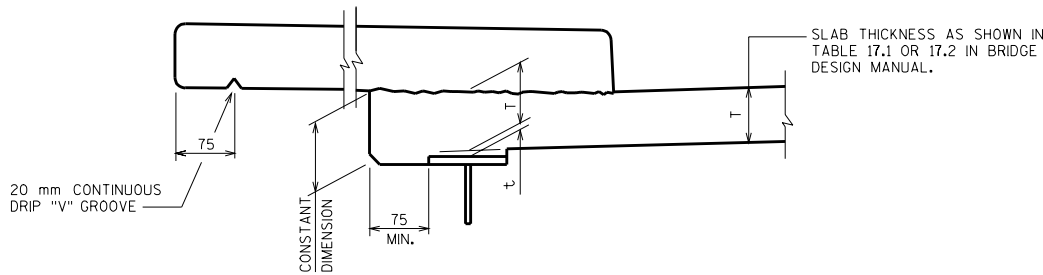
APPROVED: _____

DATE:

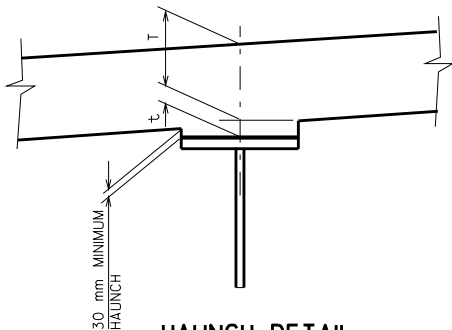
1/99



SECTION THRU SLAB



TREATMENT OF EXTERIOR GIRDER
AT SIDEWALK OVERHANG



HAUNCH DETAIL

NOTES

t = HAUNCH HEIGHT AT CENTERLINE OF GIRDER.
HAUNCH HEIGHTS WILL NORMALLY BE MADE 30 mm AT ABUTMENTS, HINGES, AND FIELD SPLICES.
HAUNCH DEPTH VARIATIONS NEED NOT BE SHOWN ON THE PLANS.

(TO DETERMINE "t": AFTER ALL STRUCTURAL STEEL HAS BEEN ERECTED. ELEVATIONS OF THE TOP FLANGES, TOP OF SPLICE PLATES, OR TOP OF COVER PLATES, WHICHEVER APPLIES, SHALL BE TAKEN AT CENTERLINE OF BEARINGS, CENTERLINE OF FIELD SPLICES, AND AT QUARTER POINTS AND FOR SPANS OVER 30000 mm LONG INCLUDE ELEVATIONS AT 1/8 POINTS OF EACH SPAN WHICH ARE MORE THAN 2000 mm FROM A FIELD SPLICE.)

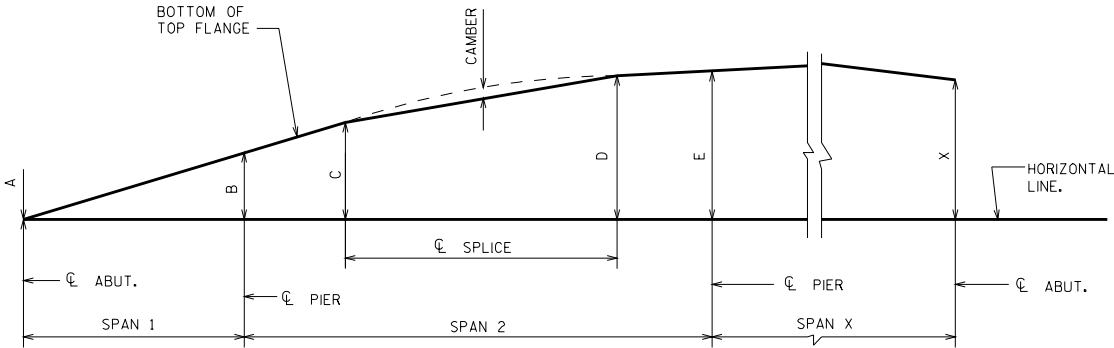
- TOP OF DECK ELEV. AT FINAL GRADE.
- TOP OF STEEL ELEV. AFTER PLACEMENT.
- + CONC. ONLY DEFLECTION; DOWNWARD DEFLECTION IS ADDED, UPWARD DEFLECTION IS SUBTRACTED.
- SLAB THICKNESS ('T')
- = "t" VALUE FOR SETTING HAUNCH.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

ELEVATIONS AT TOP OF DECK (T.D.) & TOP OF STEEL (T.S.)

		W. ABUT.	1/4 SPAN	1/2 SPAN	3/4 SPAN	Q. PIER	Q. SPLICE		Q. ABUT.
GIRDER 1	T.D.	262.485	262.472	262.457	262.445	262.430	262.418		262.338
	T.S.	262.274				262.235	262.235		262.128
GIRDER 2	T.D.	262.317	262.305	262.290	262.277	262.265	262.250		262.177
	T.S.	262.107				262.067	262.067		262.003
GIRDER X	T.D.								
	T.S.								

THESE ELEVATIONS ARE TO TOP OF STEEL (SPLICE AND COVER PLATE THICKNESS, IF APPLICABLE, ARE ACCOUNTED FOR) AND THEY ARE FOR THE MATERIAL AS ERECTED. THE ELEVATION OF THE TOP STEEL AT THE FIELD SPLICE POINTS SHALL BE CHECKED, AND CORRECTED, IF POSSIBLE, AFTER ERECTION AND BEFORE PERMANENTLY BOLTING THE DIAPHRAGMS IN PLACE.



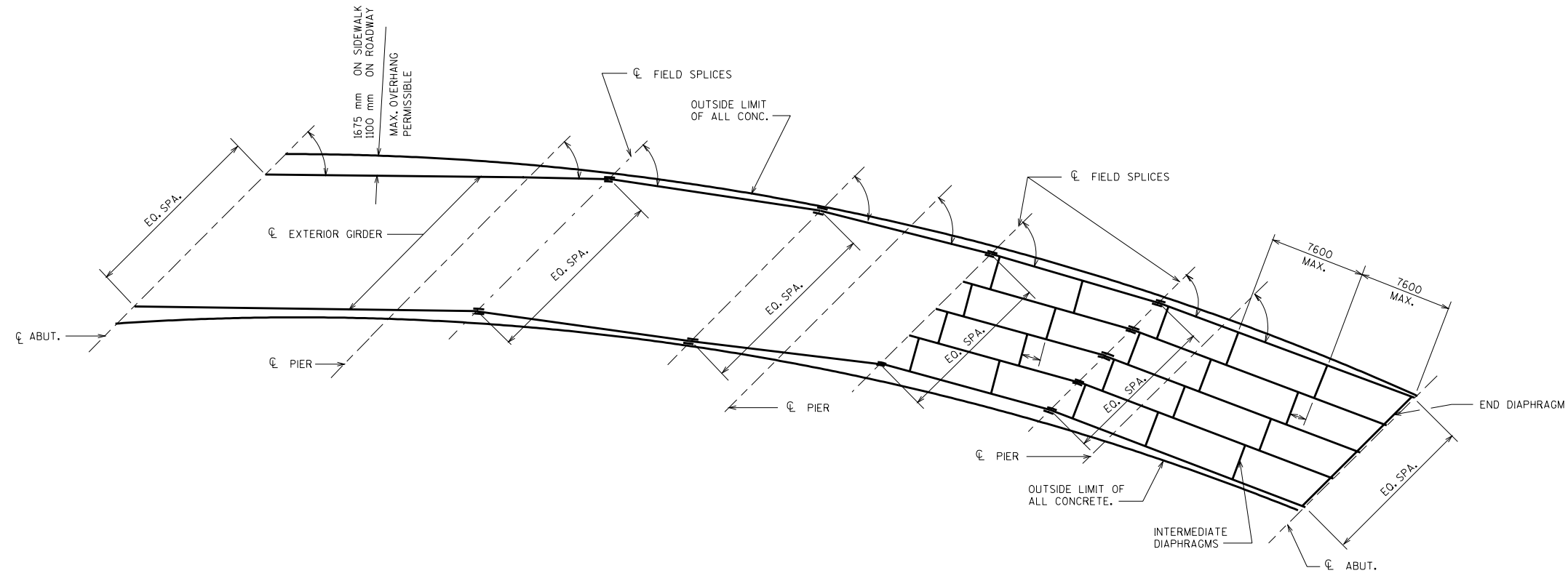
BLOCKING DIAGRAM

BLOCKING & SLAB
HAUNCH DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

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GENERAL NOTES

FOUR SPAN STRUCTURE SHOWN BUT SKETCH AND NOTES APPLY TO ANY NUMBER OF SPANS.

IF POSSIBLE, HOLD CL SUBSTRUCTURE UNITS AND CL SPLICES PARALLEL TO EACH OTHER.

GIRDERS ARE TO BE HELD PARALLEL TO EACH OTHER, WITHIN EACH GIRDER LENGTH, FOR AS MANY SPANS AS THE OVERHANG WILL PERMIT. WHEN OVERHANG IS EXCEEDED, THE GIRDER SPACING SHALL BE CHANGED IN ONE GIRDER LENGTH, AFTER WHICH THE GIRDERS SHALL AGAIN BE HELD PARALLEL TO EACH OTHER FOR AS LONG AS THE OVERHANG PERMITS.

FOR HORIZONTAL CURVES EQUAL TO OR GREATER THAN 7° THE GIRDERS SHALL BE FABRICATED ALONG THE CURVE.

NUMBER AND SIZE OF GIRDERS AND LOCATION OF FIELD SPLICES TO BE DETERMINED BY DESIGN.

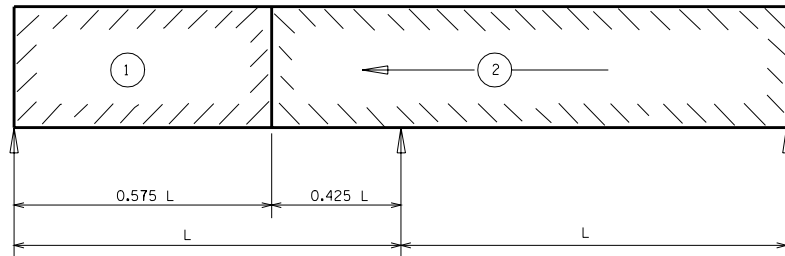
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

GIRDER LAYOUT ON CURVE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

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IDEAL POURS - 2 SPANS

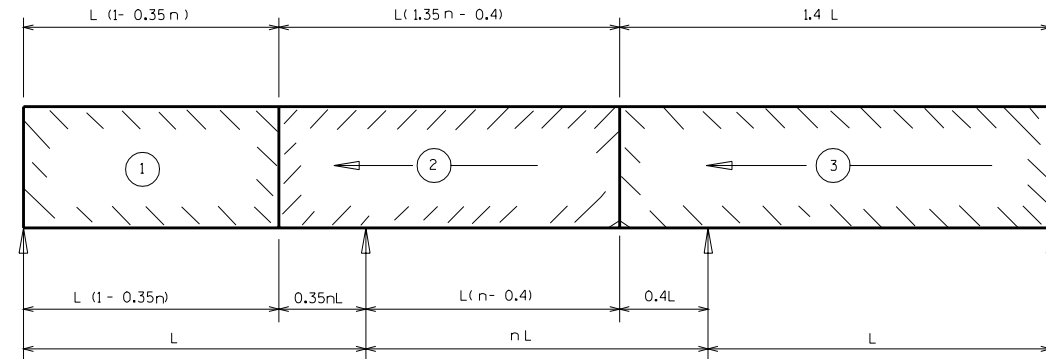
← 2 → INDICATES POUR NUMBER AND DIRECTION OF POUR

S = TOTAL NUMBER OF SPANS

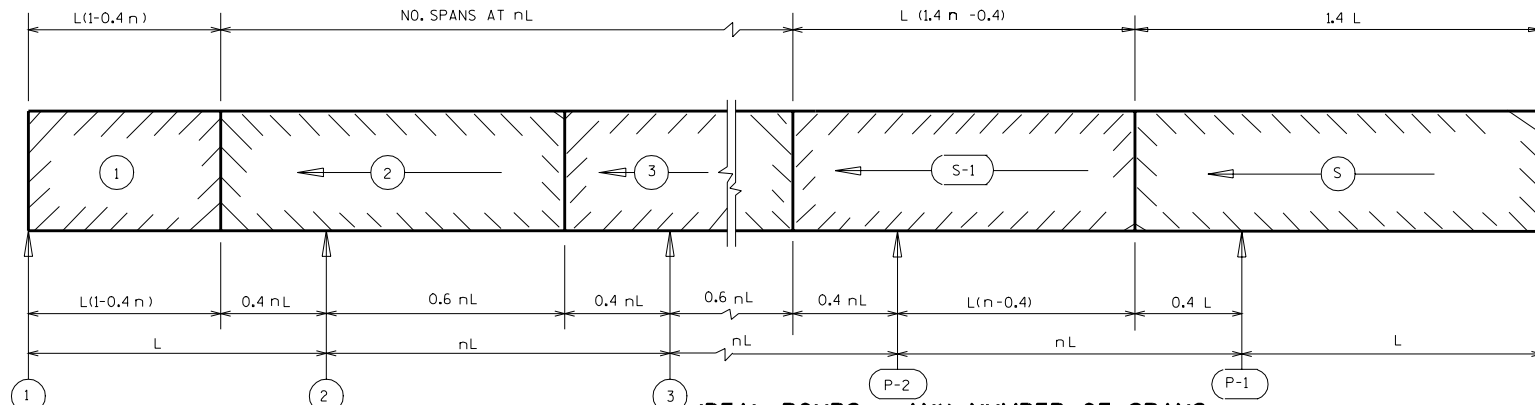
P = TOTAL NUMBER OF SUPPORTS.

L = LENGTH OF EXTERIOR SPAN.

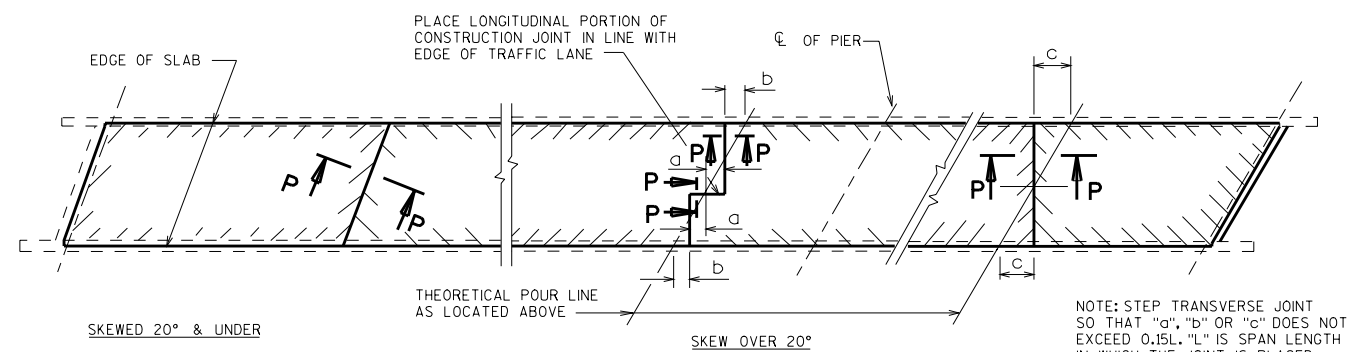
n = RATIO = $\frac{\text{INTERIOR SPAN}}{\text{EXTERIOR SPAN}}$



IDEAL POURS - 3 SPANS



IDEAL POURS - ANY NUMBER OF SPANS



PLAN VIEW - SHOWING PLACEMENT OF TRANSVERSE CONSTRUCTION JOINTS

NOTE: STEP TRANSVERSE JOINT SO THAT "a", "b" OR "c" DOES NOT EXCEED 0.15L. "L" IS SPAN LENGTH IN WHICH THE JOINT IS PLACED.

NOTES ON PLANS

THE RATE OF PLACING CONCRETE SHALL EQUAL OR EXCEED $\frac{1}{2}$ SPAN LENGTH PER HOUR BUT NEED NOT EXCEED 75 m³ PER HOUR. (REQUIRED ONLY FOR CONTINUOUS STEEL GIRDERS.)

TRANSVERSE CONSTRUCTION JOINTS, EXCEPT THOSE ADJACENT TO IN SPAN HINGES, MAY BE OMITTED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

TWO OR MORE ALTERNATE POURS MAY BE PLACED ON THE SAME DAY. (REQUIRED ONLY WHEN A POURING SEQUENCE IS SHOWN ON PLANS.)

THE CONTRACTOR MAY SUBMIT AN ALTERNATE POURING SEQUENCE SUBJECT TO THE APPROVAL OF THE STRUCTURES DESIGN SECTION. (REQUIRED ONLY WHEN A POURING SEQUENCE IS SHOWN ON PLANS.)

DESIGN NOTES

A SLAB POURING SEQUENCE AS SHOWN ON THIS SHEET IS NOT TO BE USED UNLESS REQUESTED BY THE STRUCTURES DEVELOPMENT SECTION.

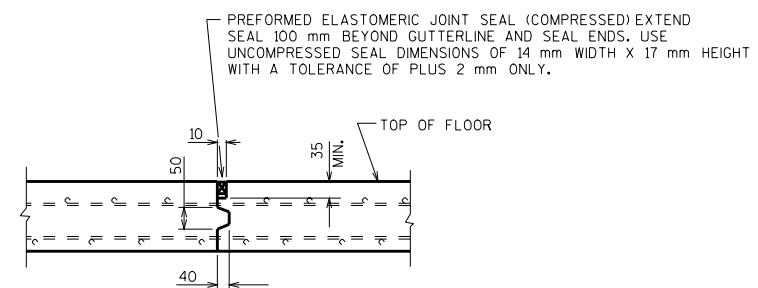
TRANSVERSE CONSTRUCTION JOINTS SHALL BE DETAILED ON PLANS TO LIMIT THE VOLUME OF POUR TO < 460 m³ IN URBAN AREAS AND < 230 m³ IN OTHER AREAS. GENERALLY FOR STEEL GIRDER SUPERSTRUCTURES LOCATE THE TRANSVERSE JOINTS AT THE 0.6 POINT (CONCRETE IN 60% OF SPAN) AND FOR PRESTRESS GIRDER SUPERSTRUCTURES LOCATE JOINTS NEAR THE 0.75 POINT. (CONCRETE IN 75% OF SPAN) CONSIDER CUT-OFF POINTS OF CONTINUITY REINFORCING STEEL WHEN LOCATING JOINTS FOR PRESTRESS GIRDER SUPERSTRUCTURES. LOCATION OF JOINTS IN STEEL GIRDER SUPERSTRUCTURES MAY VARY IF DEFLECTIONS ARE INFLUENCED BY IN SPAN HINGES OR UNUSUAL SPAN LENGTH RATIOS. CHECK WITH THE STRUCTURES DEVELOPMENT SECTION FOR ADDITIONAL INFORMATION.

DETAIL TRANSVERSE CONSTRUCTION JOINTS 1525 mm FROM CL OF IN SPAN HINGES, (ONE ON EACH SIDE OF HINGE) THE CONCRETE BETWEEN THESE JOINTS SHOULD BE THE LAST POUR PLACED.

WHEN THE WIDTH OF SLAB IS GREATER THAN 27400 mm A LONGITUDINAL CONSTRUCTION JOINT SHALL BE DETAILED. LOCATE LONGITUDINAL CONSTRUCTION JOINT ALONG EDGE OF LANE LINE AND AT LEAST 150 mm FROM EDGE OF TOP FLANGE OF GIRDER.

FOR GRADES OVER 3% THE PREFERRED DIRECTION OF POUR IS UPHILL.

ALL DIMENSIONS ARE IN MILLIMETERS.



SECTION P

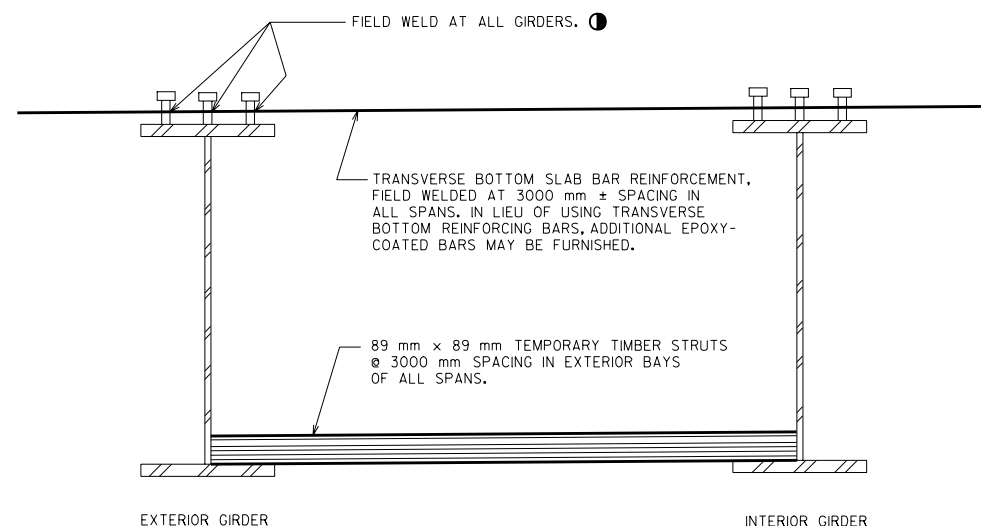
SLAB POURING SEQUENCE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

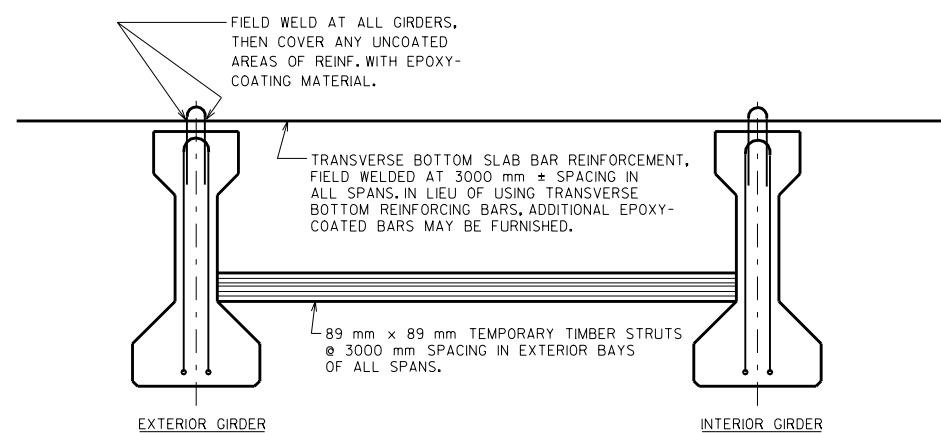
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① PROVIDE SHEAR CONNECTORS ONLY AT EXTERIOR GIRDERS IF NOT REQUIRED FOR DESIGN.

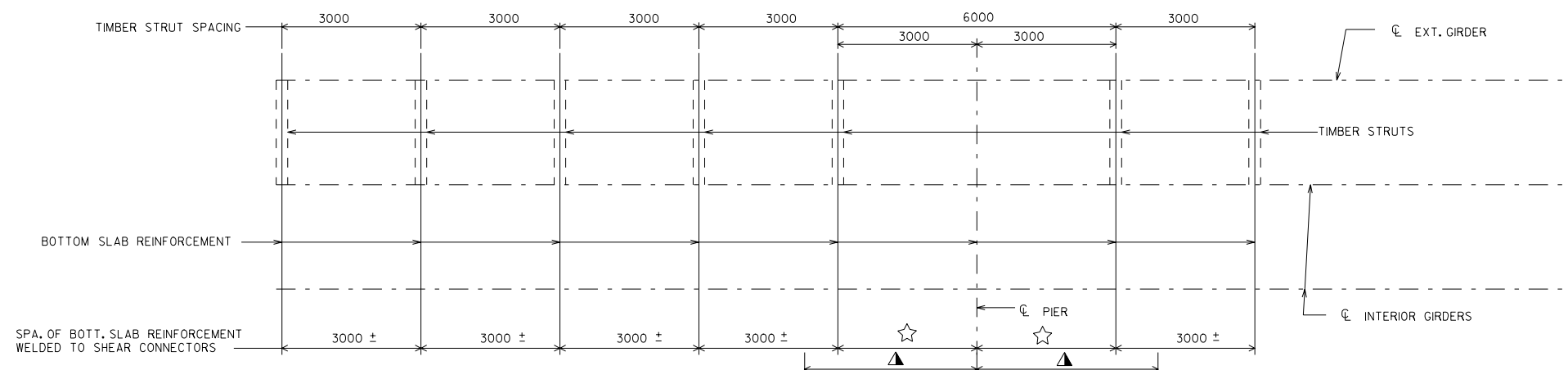


CROSS SECT. THRU RDWY.

(STEEL GIRDERS WITH WEB DEPTH < 1225 mm)

CROSS SECT. THRU RDWY.

(710 mm & 915 mm PRESTRESSED GIRDERS)



NOTE: THIS DETAIL SHALL BE CONSIDERED IF THE DISTANCE FROM C/L OF EXTERIOR GIRDER TO EDGE OF SLAB IS GREATER THAN 600 mm AND GIRDER DEPTHS ARE AS SHOWN.

ALL DIMENSIONS ARE IN MILLIMETERS.

PLAN

☆ 3000 mm ± FOR PRESTRESSED GIRDERS.

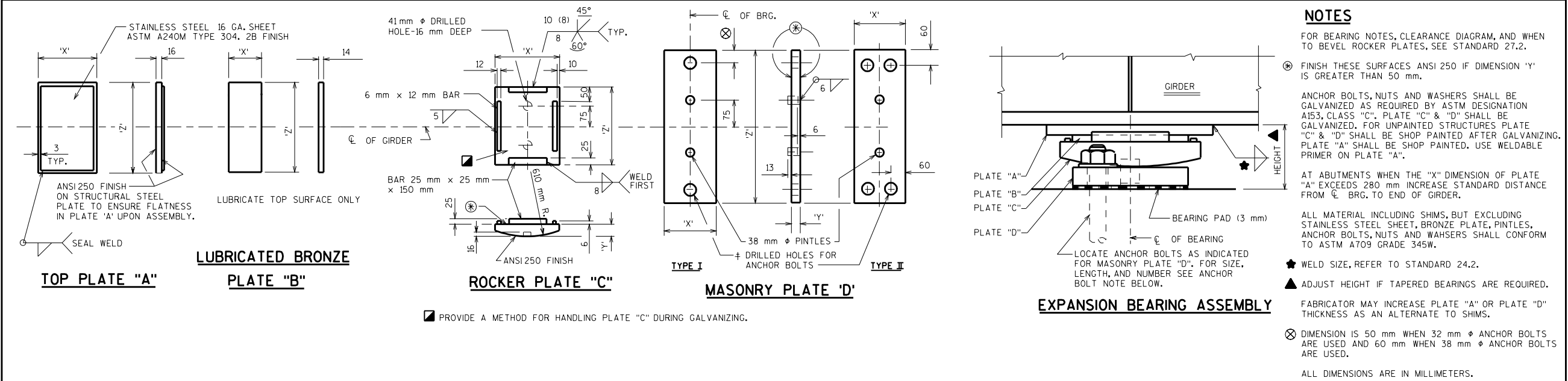
▲ DISTANCE TO SHEAR CONNECTORS FOR STEEL GIRDERS.

EXTERIOR GIRDER BRACING
FOR SLAB OVERHANG

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED:

DATE:	1/99
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250 mm BEARING

CAP. kN	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT (mm)
	X	Z	X	Z	X	Y	Z	X	Y	Z	
325	230	250	130	250	180	38	310	205	38	510	111
455	280	250	180	250	230	43	310	205	38	510	116
580	330	250	230	250	280	57	310	205	38	510	130
705	380	250	280	250	330	67	310	230	38	510	140
830	430	250	330	250	380	77	310	255	45	510	157
960	480	250	380	250	430	107	310	305	50	510	192
1085	530	250	430	250	480	107	310	330	67	510	209
1210	580	250	480	250	530	127	310	380	67	510	229
1340	630	250	530	250	580	127	310	405	87	510	249

300 mm BEARING

CAP. kN	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT (mm)
	X	Z	X	Z	X	Y	Z	X	Y	Z	
395	230	300	130	300	180	38	360	205	38	560	111
545	280	300	180	300	230	43	360	205	38	560	116
700	330	300	230	300	280	57	360	205	38	560	130
850	380	300	280	300	330	67	360	230	38	560	140
1000	430	300	330	300	380	77	360	280	50	560	162
1155	480	300	380	300	430	107	360	330	67	560	209
1305	530	300	430	300	480	107	360	355	67	560	209
1460	580	300	480	300	530	127	360	405	87	560	249
1610	630	300	530	300	580	127	360	430	87	585	249

350 mm BEARING

CAP. kN	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT (mm)
	X	Z	X	Z	X	Y	Z	X	Y	Z	
460	230	350	130	350	180	38	410	205	38	610	111
640	280	350	180	350	230	43	410	205	38	610	116
820	330	350	230	350	280	57	410	205	38	610	130
995	380	350	280	350	330	67	410	255	45	610	147
1175	430	350	330	350	380	77	410	305	50	610	162
1350	480	350	380	350	430	107	410	330	67	610	209
1530	530	350	430	350	480	107	410	380	67	635	209
1705	580	350	480	350	530	127	410	405	87	635	249
1885	630	350	530	350	580	127	410	455	87	635	249

400 mm BEARING

CAP. kN	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT (mm)
	X	Z	X	Z	X	Y	Z	X	Y	Z	
530	230	400	130	400	180	38	460	205	38	660	111
730	280	400	180	400	230	43	460	205	38	660	116
935	330	400	230	400	280	57	460	230	38	660	130
1140	380	400	280	400	330	67	460	280	50	660	152
1345	430	400	330	400	380	77	460	305	50	660	162
1550	480	400	380	400	430	107	460	355	67	685	209
1750	530	400	430	400	480	107	460	380	67	685	209
1955	580	400	480	400	530	127	460	430	87	685	249
2160	630	400	530	400	580	127	460	480	87	685	249

450 mm BEARING

CAP. kN	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT (mm)
	X	Z	X	Z	X	Y	Z	X	Y	Z	
595	230	450	130	450	180	38	510	205	38	710	111
825	280	450	180	450	230	43	510	205	38	710	116
1055	330	450	230	450	280	57	510	230	38	710	130
1285	380	450	280	450	330	67	510	280	50	710	152
1515	430	450	330	450	380	77	510	330	67	735	179
1745	480	450	380	450	430	107	510	355	67	735	209
1975	530	450	430	450	480	107	510	405	87	735	229
2205	580	450	480	450	530	127	510	455	87	735	249
2430	630	450	530	450	580	127	510	505	87	735	249

500 mm BEARING

CAP. kN	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT (mm)
	X	Z	X	Z	X	Y	Z	X	Y	Z	
665	230	500	130	500	180	38	560	205	38	760	111
920	280	500	180	500	230	43	560	205	38	760	116
1175	330	500	230	500	280	57	560	255	45	760	137
1430	380	500	280	500	330	67	560	280	50	760	152
1685	430	500	330	500	380	77	560	330	67	785	179
1940	480	500	380	500	430	107	560	380	67	785	209
2195	530	500	430	500	480	107	560	430	87	785	229
2450	580	500	480	500	530	127	560	480	87	785	249
2705	630	500	530	500	580	127	560	530	107	785	269

ANCHOR BOLT NOTES:

FOR SPAN LENGTHS UP TO 30500 mm, USE A TYPE I MASONRY PLATE 'D' WITH (2)-32 mm ϕ x 435 mm LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 30500 mm UP TO 45500 mm, USE A TYPE C MASONRY PLATE 'D' WITH (2)-38 mm ϕ x 560 mm LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 45500 mm, USE A TYPE II MASONRY PLATE 'D' WITH (4)-38 mm ϕ x 560 mm LONG ANCHOR BOLTS.

*DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE 'D' SHALL HAVE A DIAMETER 10 mm LARGER THAN ANCHOR BOLT.

EXPANSION BEARING DETAILS TYPE 'A'-STEEL GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99

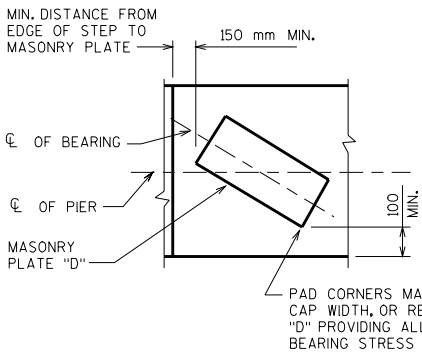
LENGTH OF PLATE "C"	CAP. KN	PLATE C			PLATE D			HEIGHT (mm)
		X	Y	Z	X	Y	Z	
250	660	130	48	250	205	38	480	89
300	820	130	48	300	230	38	530	89
	910	130	48	300	255	45	530	96
350	900	130	48	350	230	38	580	89
	1100	130	48	350	280	50	580	101
	1300	130	67	350	330	67	580	137
	1560	130	67	350	380	67	605	137
	1770	130	67	350	430	87	605	157
400	870	130	48	400	205	38	630	89
	1090	130	48	400	255	45	630	96
	1305	130	48	400	305	50	630	101
	1580	130	67	400	355	67	655	137
	1805	130	67	400	405	87	655	157
	2005	130	67	400	455	87	655	157
	2120	130	67	400	480	87	655	157
450	1060	130	48	450	230	38	680	89
	1295	130	48	450	280	50	680	101
	1580	130	48	450	330	67	705	118
	1700	130	48	450	355	67	705	118
	1945	130	67	450	405	87	705	157
	2165	130	67	450	455	87	705	157
	2405	130	67	450	505	87	705	157
500	1140	130	48	500	230	38	730	89
	1265	130	48	500	255	45	730	96
	1560	130	48	500	305	50	755	101
	1825	130	48	500	355	67	755	118
	2060	130	67	500	405	87	755	157
	2320	130	67	500	455	87	755	157
	2580	130	67	500	505	87	755	157
550	2710	130	67	500	530	107	755	177
	1350	130	48	550	255	45	780	96
	1670	130	48	550	305	50	805	101
	1945	130	48	550	355	67	805	118
	2200	130	67	550	405	87	805	157
	2475	130	67	550	455	87	805	157
	2755	130	67	550	505	87	805	157
	3060	130	67	550	560	107	805	177
	3200	130	67	550	585	107	805	177

ANCHOR BOLT NOTES

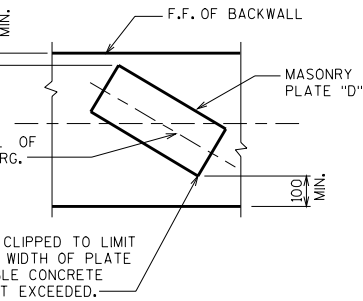
FOR SPAN LENGTHS UP TO 30500 mm; USE A TYPE C MASONRY PLATE "D" WITH (2) - 32 mm ϕ x 435 mm LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 30500 mm UP TO 45500 mm; USE A TYPE C MASONRY PLATE "D" WITH (2) - 38 mm ϕ x 560 mm LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 45500 mm; USE A TYPE D MASONRY PLATE "D" WITH (4) - 38 mm ϕ x 560 mm LONG ANCHOR BOLTS.

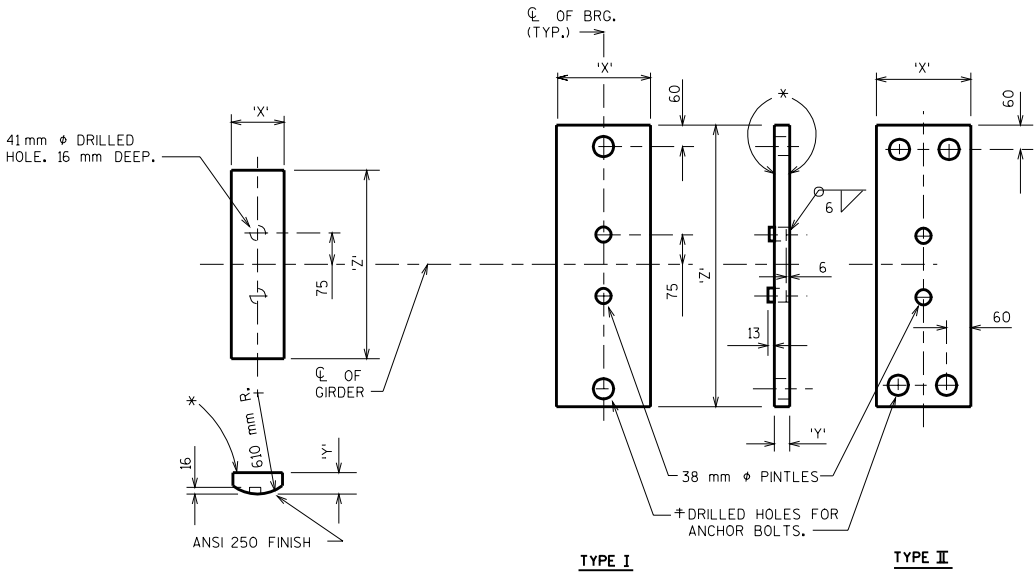


AT SKEWED PIER



AT SKEWED ABUTMENTS

CLEARANCE DIAGRAM

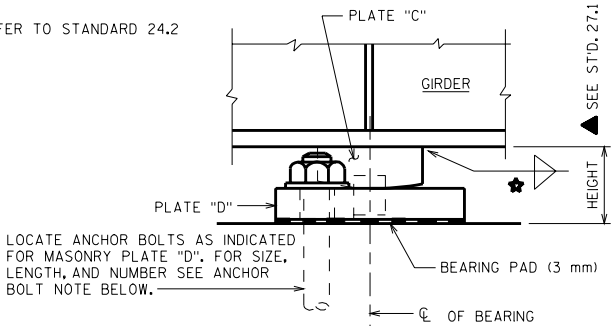


ROCKER PLATE "C"

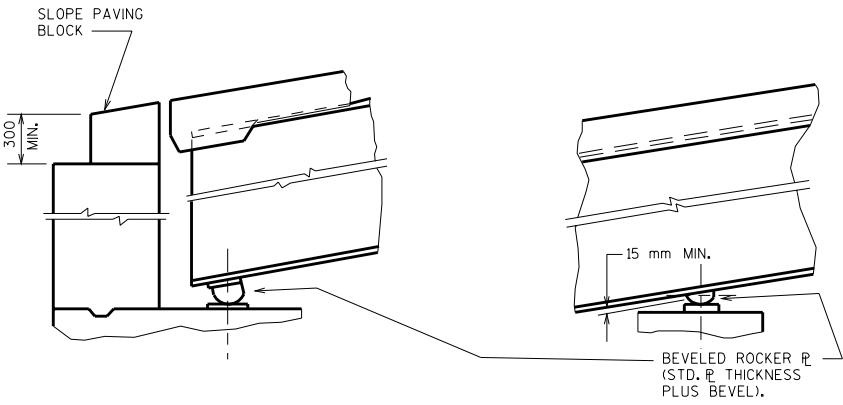
MASONRY PLATE "D"

* FINISH THESE SURFACES ANSI 250 IF DIMENSION IS GREATER THAN 50 mm

★ FOR WELD SIZE, REFER TO STANDARD 24.2



FIXED BEARING ASSEMBLY



AT EXPANSION BRG.

AT FIXED BRG.

BEVELED ROCKERS WITH GRADES GREATER THAN 3%

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT CL OF GIRDER AND CL OF BEARING.

FABRICATOR MAY INCREASE PLATE "D" THICKNESS AS AN ALTERNATE TO SHIMS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ANCHOR BOLTS SHALL BE THREADED 75 mm. PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS "D" PLATE THICKNESS + 60 mm ABOVE TOP OF CONCRETE.

ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING PINTLES, ANCHOR BOLTS, NUTS & WASHERS SHALL CONFORM TO ASTM A709M GRADE 345W.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OR EQUIVALENT YIELD STRENGTH AND ELONGATION.

ALL MATERIALS IN TYPE "A" BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR EITHER "EXPANSION BEARING ASSEMBLIES" OR "FIXED BEARING ASSEMBLIES".

CHAMFER TOP OF PINTLES 3 mm. DRILL HOLES FOR PINTLES IN ALL MASONRY PLATES FOR DRIVING FIT.

PROVIDE 3 mm THICK BEARING PAD SAME SIZE AS MASONRY PLATE "D" FOR EACH BEARING.

HEIGHT OF BEARINGS GIVEN IN TABLES INCLUDES 3 mm BEARING PADS.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

† DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 10 mm LARGER THAN ANCHOR BOLT.

ALL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709M GRADE 250, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C".

PLATE "C" SHALL NOT BE GALVANIZED. PLATE "C" SHALL BE SHOP PAINTED. USE WELDABLE PRIMER.

PLATE "D" SHALL BE GALVANIZED. FOR UNPAINTED STRUCTURES PLATE "D" SHALL BE SHOP PAINTED AFTER GALVANIZING.

DESIGNER NOTES

THE BEARING NOTES PERTAIN TO BOTH EXPANSION AND FIXED BEARINGS.

REFER TO DETAIL FOR THE USE OF BEVELED ROCKERS FOR GRADES GREATER THAN 3%.

ALL DIMENSIONS ARE MILLIMETERS.

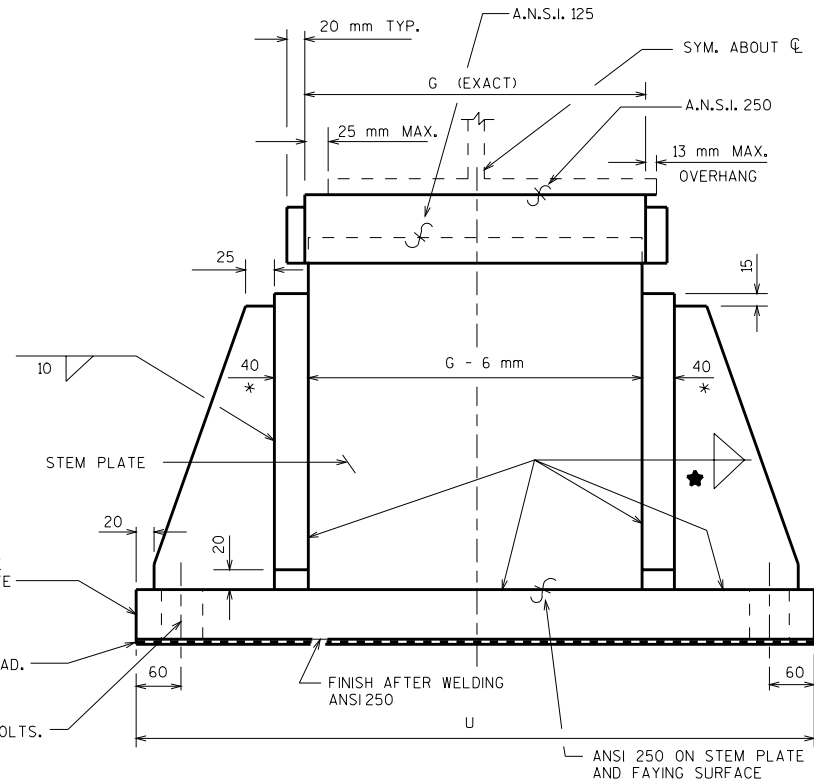
DESIGN DATA

CONCRETE MASONRY = 6.9 MPa
MAXIMUM HORIZONTAL FORCE = 310 kN

FIXED BEARING DETAILS
TYPE "A"-STEEL GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99



NOTES

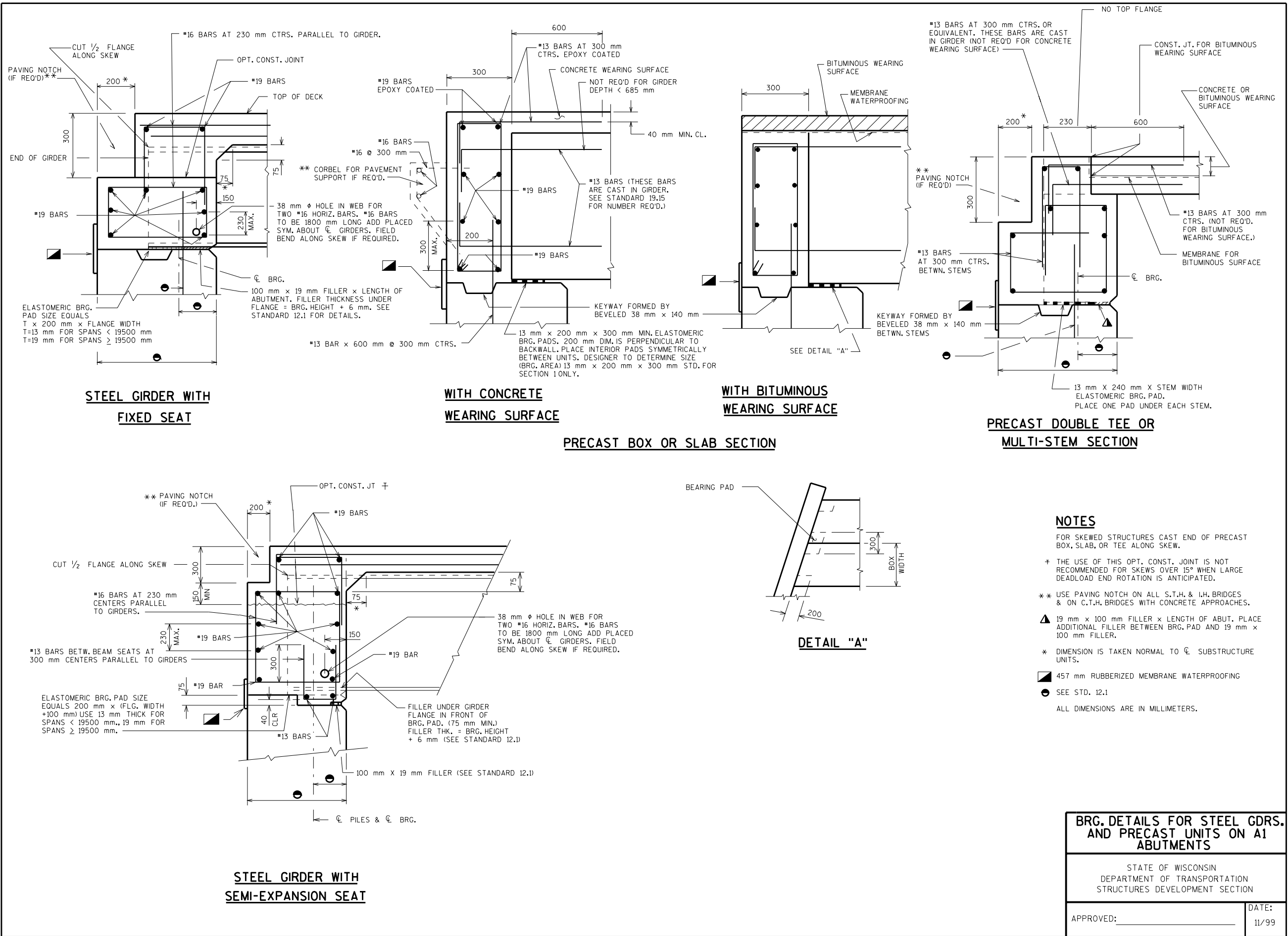
ALL DIMENSIONS ARE IN MILLIMETERS.

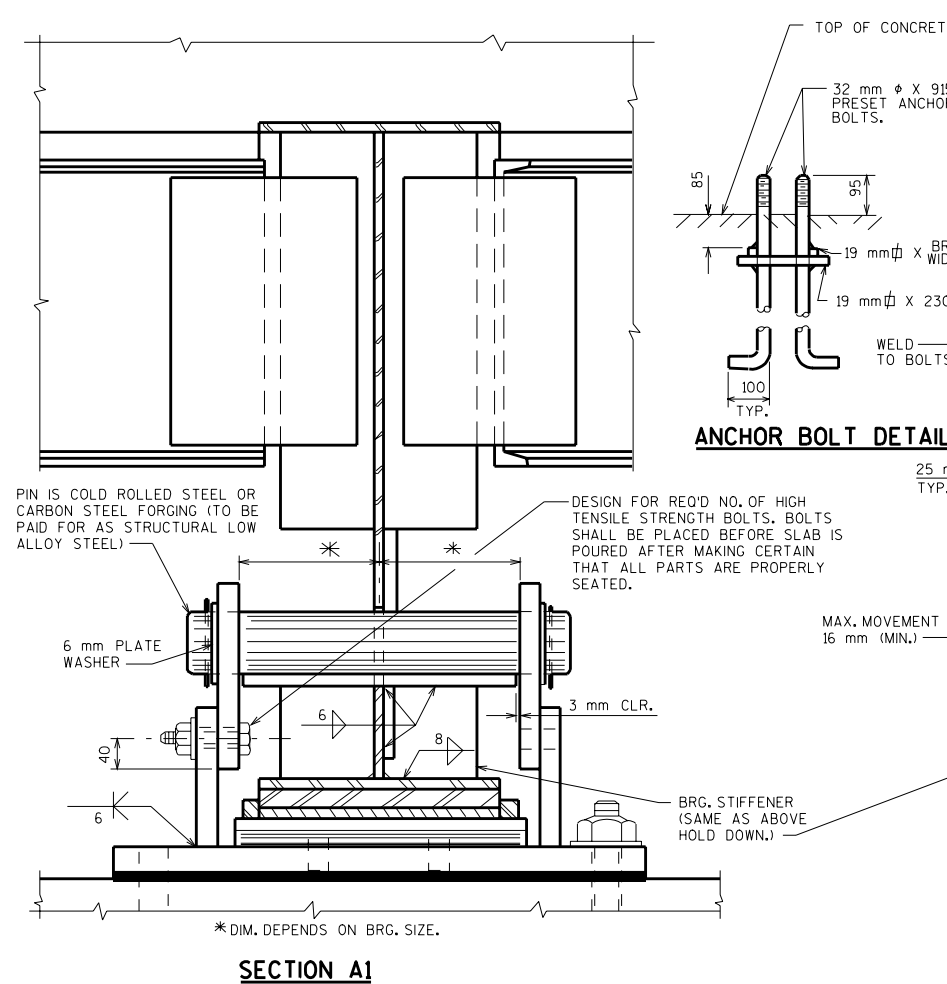
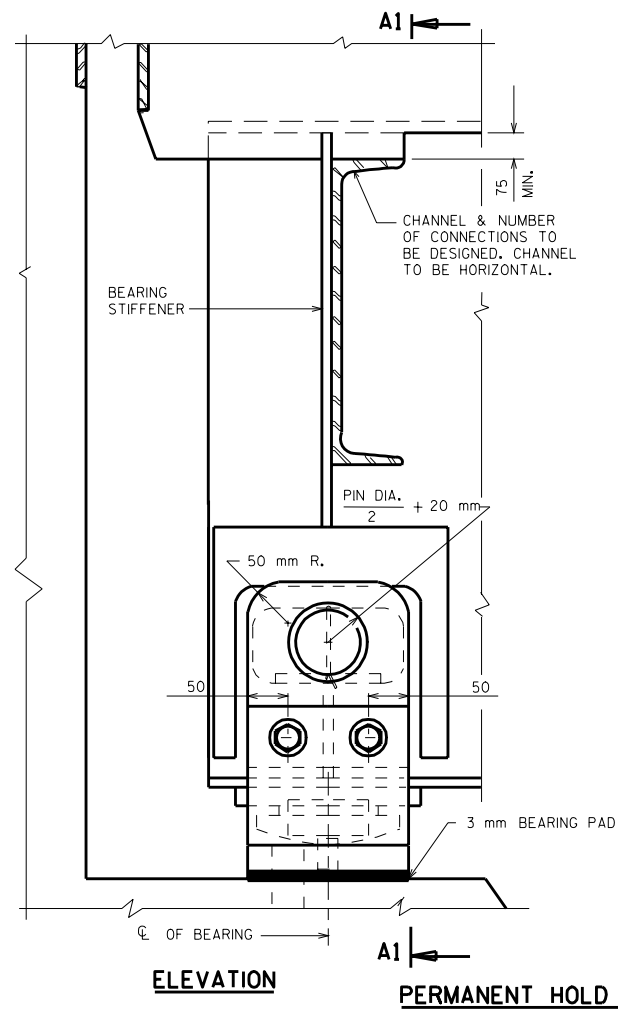
 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

* FOR REACTIONS ≥ 4450 KN
USE 50 mm STIFFENERS.

[illegible]

APPROVED: _____	DATE: 1/99
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NOTES (PERMANENT HOLD DOWN DEVICE)

ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS

ANCHOR BOLTS SHALL BE THREADED 75 mm. PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX. NUT PER BOLT. CHAMFER TOP OF ANCHOR BOLTS PRIOR TO THREADING.

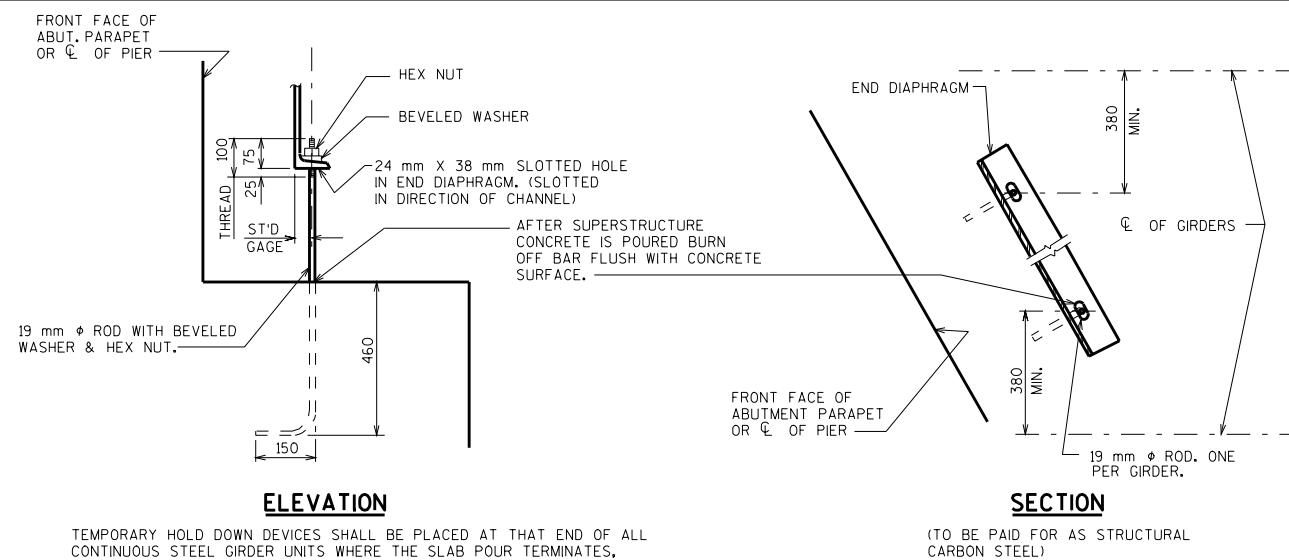
ALL MATERIAL EXCEPT PINTLES, ANCHOR BOLTS, NUTS, WASHERS AND PINS SHALL BE MADE OF A709M GRADE 345W STEEL.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ALL MATERIALS IN BEARINGS INCLUDING HOLD DOWN SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARINGS".

WHEN REQUIRED, HOLD DOWN DEVICES SHALL BE PLACED SYMMETRICALLY ABOUT LONGIT. CL OF FRAMING PLAN. MAXIMUM SPACING OF HOLD DOWNS SHALL BE AT ALTERNATE GIRDERS. HOLD DOWN DEVICE TO BE DESIGNED FOR MIN. UPLIFT CAPACITY OF 90 kN.

ALL DIMENSIONS ARE IN MILLIMETERS.



HOLD DOWN DEVICES

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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APPROVED: _____ DATE: 1/99



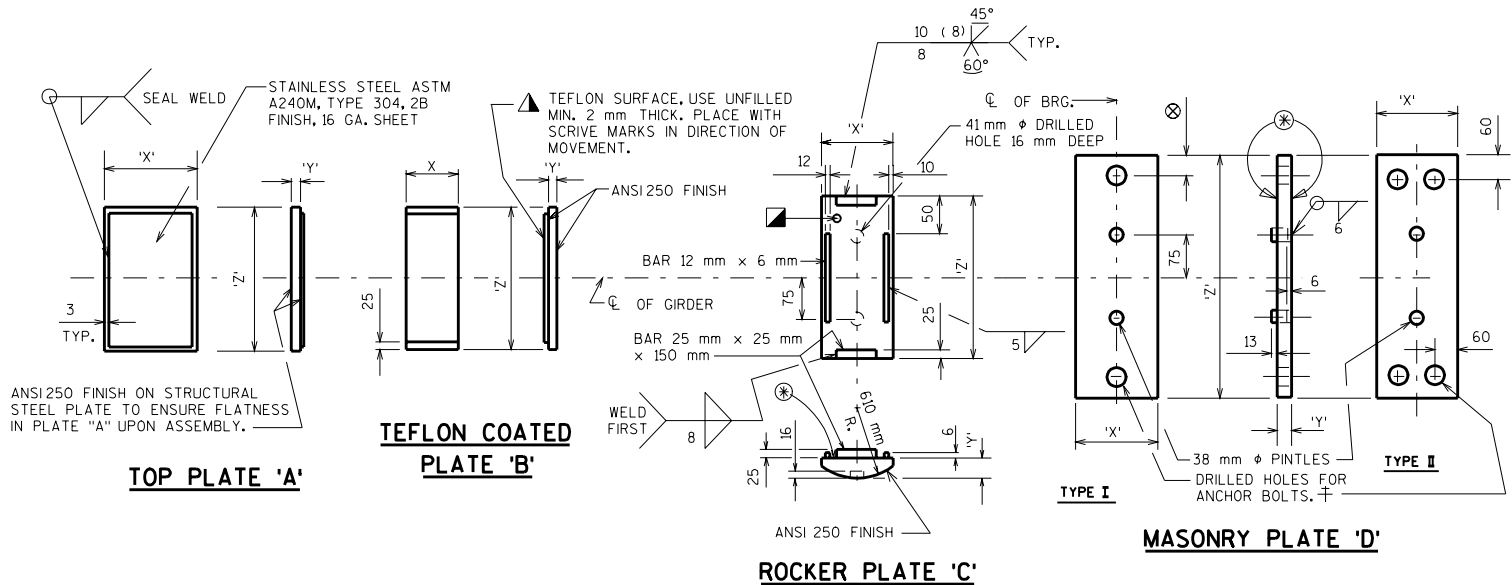
⊗ CHECK AASHTO 14.4.1.4 REQUIREMENTS TO SEE
IF THIS PLATE SHOULD BE TAPERED.

Δ H (mm)	EXP. LENGTH (mm)	TOTAL BEARING HEIGHT H (mm)	TOTAL ELASTOMER THICKNESS (mm)	LONGITUDINAL LENGTH OF BEARING L (MIN.)	STEEL PLATE THICKNESS (mm) EACH	ELASTOMER THICKNESS T (mm)	NO.OF PLATES REQ'D.
25	42000	63	51	205	3	13	4
32	52500	79	64	255	3	13	5
38	63500	95	77	305	3	13	6
44	74000	111	90	355	3	13	7
51	85000	127	103	385	3	13	8
57	95500	143	116	435	3	13	9

$$\Delta_H = \text{TOTAL HORIZONTAL MOVEMENT OF SUPERSTRUCTURE MEASURED FROM STATE AT WHICH BEARING IS UNDEFORMED.}$$

ALL DIMENSIONS ARE IN MILLIMETERS.

<p align="center">ELASTOMERIC BEARINGS FOR PRESTRESSED CONCRETE GIRDERS</p>	
<p align="center">STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION</p>	
<p>APPROVED: _____</p>	<p>DATE: 6/02</p>



250 mm BEARING

CAP. kN	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT (mm)
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
355	230	16	250	130	14	250	180	38	310	205	38	510	113
635	330	16	250	230	14	250	280	57	310	205	38	510	132
910	430	16	250	330	14	250	380	87	310	280	50	510	174

300 mm BEARING

CAP. kN	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT (mm)
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
445	230	16	300	130	14	300	180	38	360	205	38	560	113
620	280	16	300	180	14	300	230	48	360	205	38	560	123
965	380	16	300	280	14	300	330	77	360	280	50	560	164

350 mm BEARING

CAP. kN	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT (mm)
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
745	280	16	350	180	14	350	230	48	410	205	38	610	123
1365	430	16	350	330	14	350	380	87	410	355	67	610	191
1775	530	16	350	430	14	350	480	107	410	430	87	635	231

400 mm BEARING

CAP. kN	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT (mm)
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
865	280	16	400	180	14	400	230	48	460	205	38	660	123
1350	380	16	400	280	14	400	330	77	460	305	50	685	164
1835	480	16	400	380	14	400	430	107	460	405	87	685	231
2075	530	16	400	430	14	400	480	107	460	455	87	685	231

450 mm BEARING

CAP. kN	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT (mm)
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
990	280	16	450	180	14	450	230	48	510	230	38	710	123
1265	330	16	450	230	14	450	280	57	510	280	50	710	144
2095	480	16	450	380	14	450	430	107	510	430	87	735	231
2645	580	16	450	480	14	450	530	137	510	560	107	735	281

500 mm BEARING

CAP. kN	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT (mm)
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
805	230	16	500	130	14	500	180	38	560	205	38	760	113
1115	280	16	500	180	14	500	230	48	560	230	38	760	123
1735	380	16	500	280	14	500	330	77	560	330	67	785	181
2355	480	16	500	380	14	500	430	107	560	455	87	785	231
2975	580	16	500	480	14	500	530	137	560	585	107	785	281

NOTES

FOR BEARING NOTES, CLEARANCE DIAGRAM, AND WHEN TO BEVEL ROCKER PLATES, SEE STANDARD 27.2.

⊗ FINISH THESE SURFACES ANSI250 IF DIMENSION "Y" IS GREATER THAN 50 mm.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C". PLATE "C" & "D" SHALL BE GALVANIZED. FOR UNPAINTED STRUCTURES PLATE "C" & "D" SHALL BE SHOP PAINTED AFTER GALVANIZING. PLATE "A" & "B" SHALL BE SHOP PAINTED. USE WELDABLE PRIMER ON PLATE "A".

AT ABUTMENTS WHEN THE "X" DIMENSION OF PLATE "A" EXCEEDS 280 mm INCREASE STANDARD DISTANCE FROM ϕ BRG. TO END OF GIRDER.

ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING STAINLESS STEEL SHEET, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709M GRADE 345W.

☆ WELD SIZE, REFER TO STANDARD 24.2.

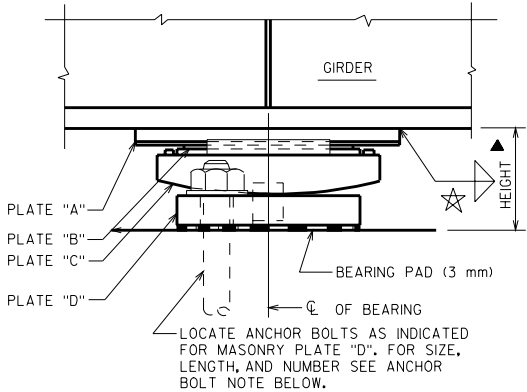
▲ ADJUST HEIGHT IF TAPERED BEARINGS ARE REQUIRED.

FABRICATOR MAY INCREASE PLATE "A" OR PLATE "D" THICKNESS AS AN ALTERNATE TO SHIMS.

⊗ DIMENSION IS 50 mm WHEN 32 mm ϕ ANCHOR BOLTS ARE USED AND 60 mm WHEN 38 mm ϕ ANCHOR BOLTS ARE USED.

ALL MATERIALS IN TYPE "A-T" BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "EXPANSION BEARING ASSEMBLIES".

ALL DIMENSIONS ARE IN MILLIMETERS.



EXPANSION BEARING ASSEMBLY

▲ BOND STEEL AND TEFLON WITH ADHESIVE MATERIAL MEETING FED. SPEC. MMM-A-134, FEP FILM OR EQUAL.

▣ PROVIDE A METHOD FOR HANDLING PLATE "C" DURING GALVANIZING.

ANCHOR BOLT NOTES

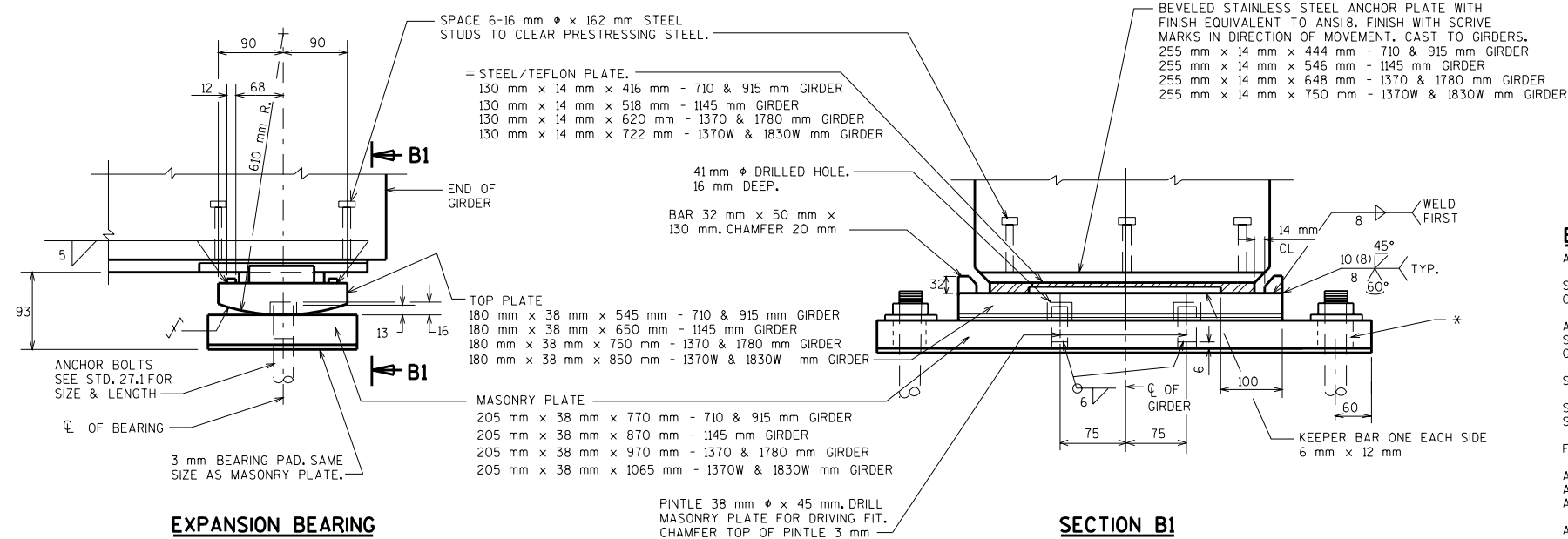
FOR SPAN LENGTHS UP TO 30500 mm ,USE A TYPE I MASONRY PLATE "D" WITH 2 - 32 mm ϕ x 435 mm LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 30500 mm UP TO 45500 mm ,USE A TYPE I MASONRY PLATE "D" WITH 2 - 38 mm ϕ x 560 mm LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 45500 mm ;USE A TYPE II MASONRY PLATE "D" WITH 4 - 38 mm ϕ x 560 mm LONG ANCHOR BOLTS

⊕ DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 10 mm LARGER THAN ANCHOR BOLT.

STAINLESS STEEL - TFE EXPANSION BEARING DETAILS TYPE "A-T"	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/99



† TEFLON SURFACE, USE UNFILLED MIN. 2 mm THICKNESS. PLACE WITH SCRIVE MARKS IN DIRECTION OF MOVEMENT. BOND STEEL AND TEFLON WITH ADHESIVE MATERIAL MEETING FED. SPEC. MMM-A-134, FEP FILM OR EQUAL. SEE STD. 27.8.

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT CL OF GIRDER AND CL OF BEARING.

SEE STANDARD 27.2 AND 19.14 FOR CLEARANCE REQUIREMENTS AND STANDARD 27.2 ON WHEN TO BEVEL ROCKERS.

ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING STAINLESS STEEL PLATE, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709M GRADE 345W.

STAINLESS STEEL PLATE SHALL CONFORM TO A.S.T.M. A240M, TYPE 304.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

FABRICATOR MAY INCREASE "MASONRY PLATE" THICKNESS AS AN ALTERNATE TO SHIMS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL SURFACES MARKED χ SHALL BE MACHINE FINISHED ANSI 250 UNLESS OTHERWISE SHOWN.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ALL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709M GRADE 250, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

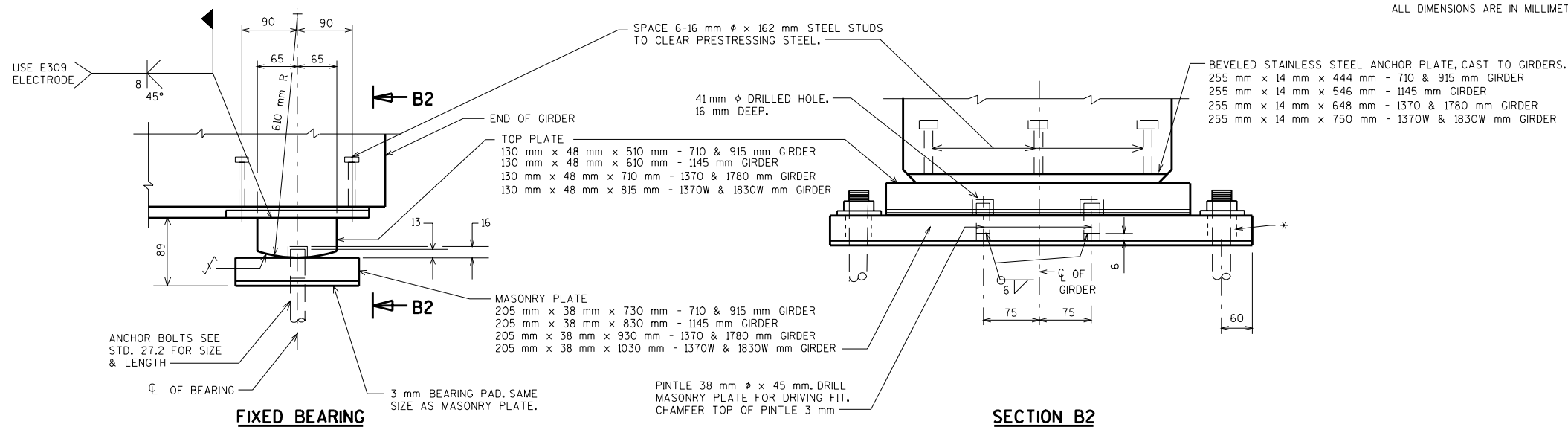
* DRILLED HOLES FOR ANCHOR BOLTS SHALL HAVE A DIAMETER 10 mm LARGER THAN ANCHOR BOLT.

MASONRY PLATE, TOP PLATE, KEEPER BARS, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C". STEEL PLATE ATTACHED TO TEFLON SURFACE SHALL BE SHOP PAINTED.

ANCHOR BOLTS SHALL BE THREADED 75 mm. PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS "MASONRY PLATE" THICKNESS +60 mm ABOVE TOP OF CONCRETE.

ALL MATERIALS IN "STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS", INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR EITHER "EXPANSION BEARING ASSEMBLIES, EACH" OR "FIXED BEARING ASSEMBLIES, EACH".

ALL DIMENSIONS ARE IN MILLIMETERS.

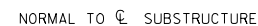
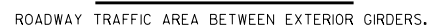
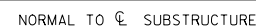


STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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APPROVED: _____

DATE:
1/03

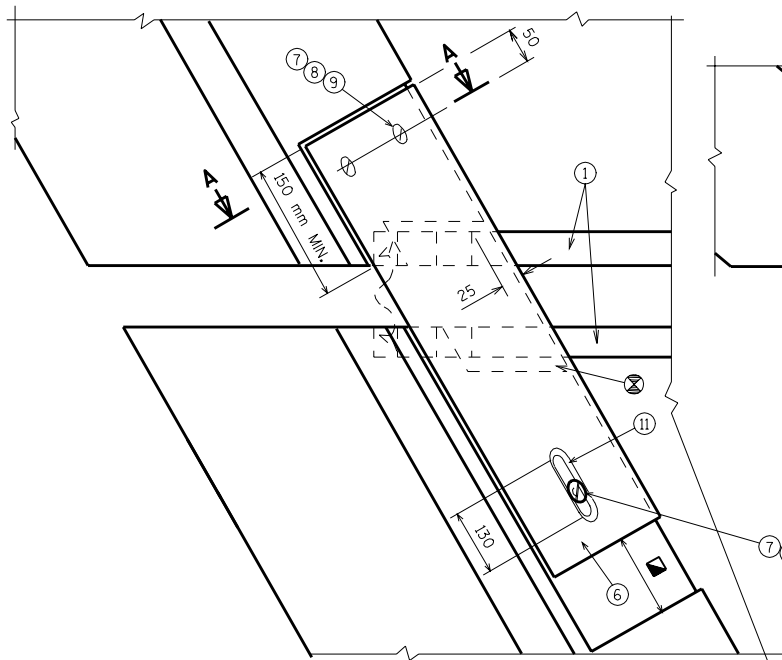


REFER TO STANDARD 28.2

ALL DIMENSIONS ARE IN MILLIMETERS.

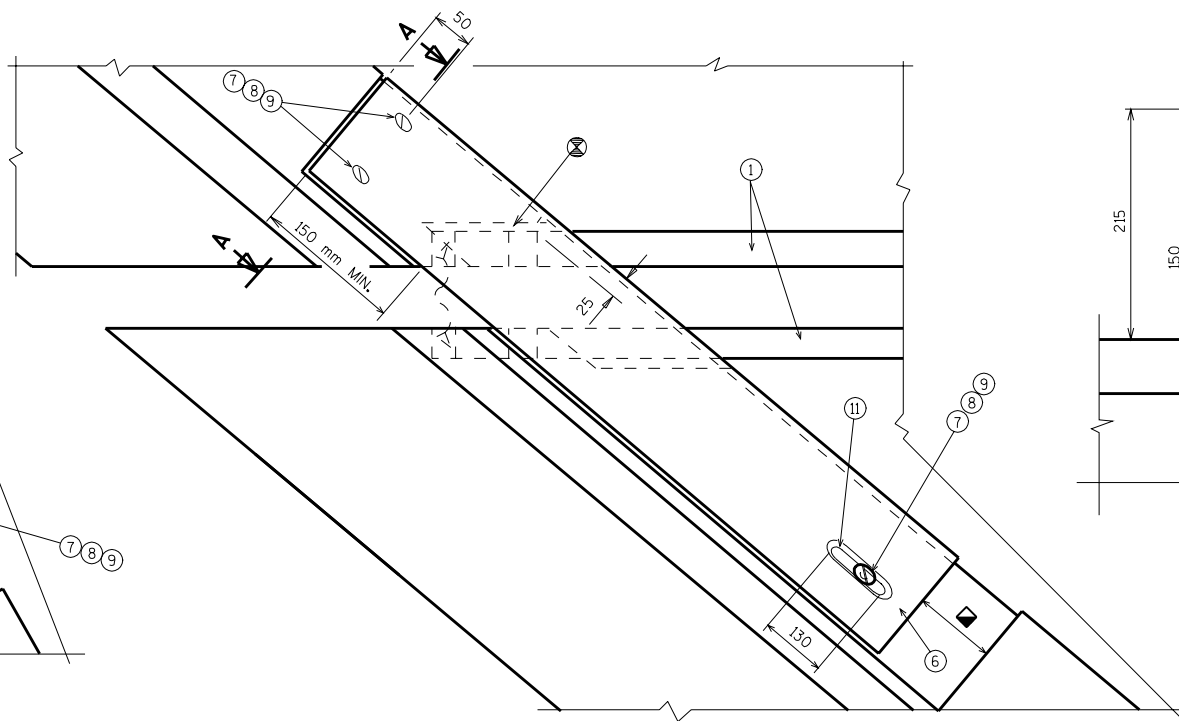


DATE:	1-02
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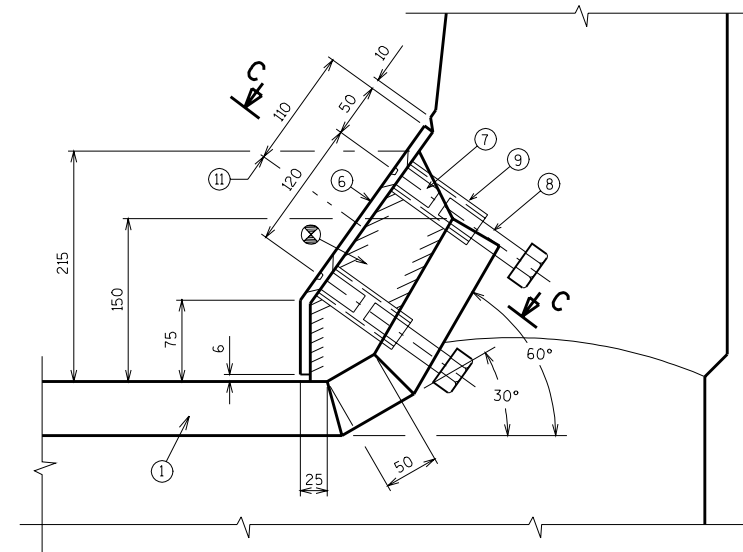


PLAN 10° ≤ 30° SKEWS

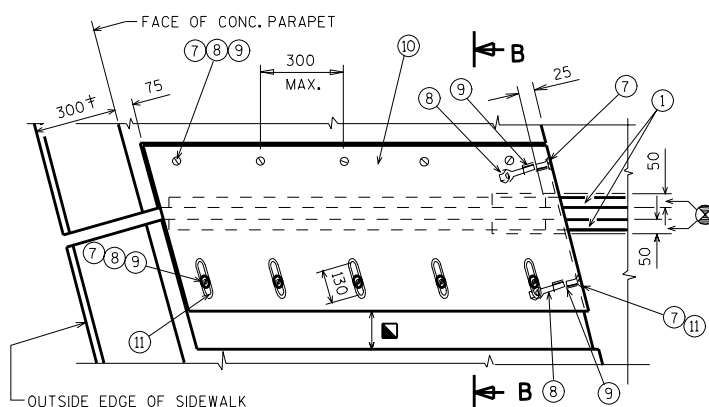
(ITEMS 6 THRU 9 NOT REQ'D FOR SKEWS < 10°)



PLAN > 30° SKEWS

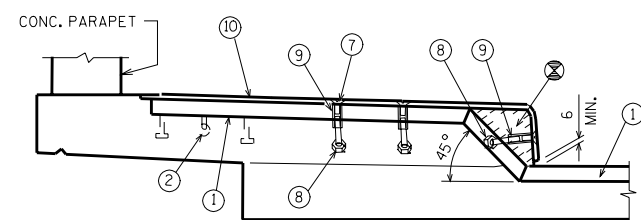


SECTION A-A



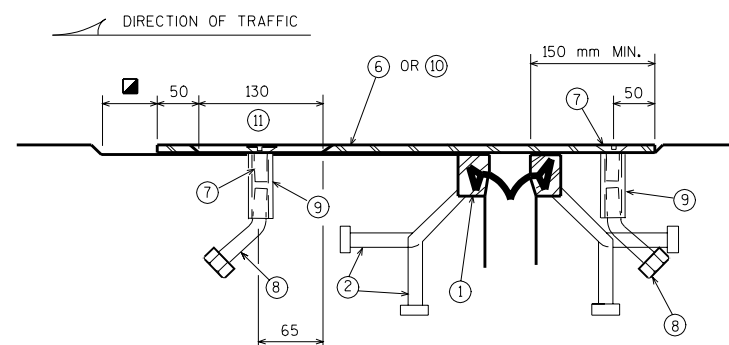
PLAN AT SIDEWALK

±350 mm WHEN "VERTICAL FACE PARAPET TYPE 'TX' IS USED

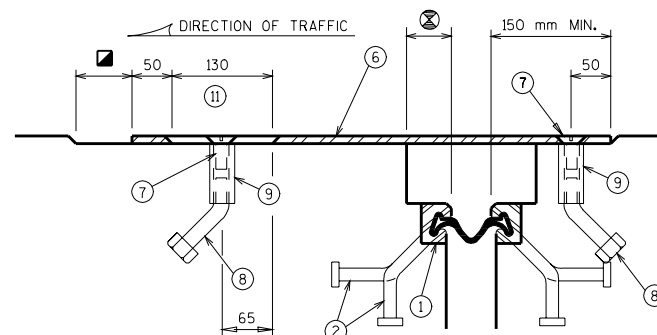


SECTION AT SIDEWALK

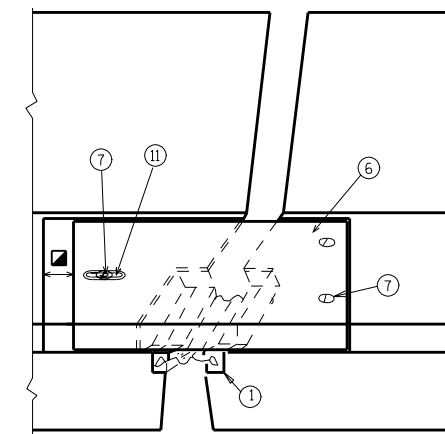
NOTE: COVER PLATE REQ'D FOR ALL SIDEWALKS



SECTION B-B



SECTION C-C



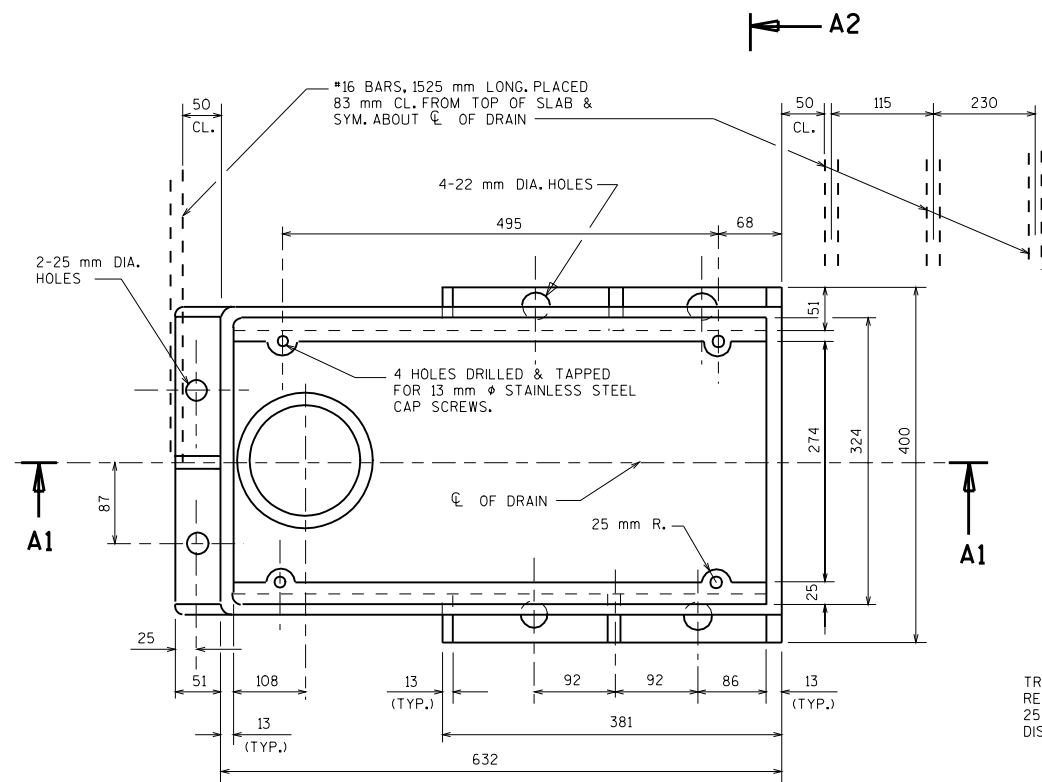
**VIEW OF PARAPET PLATES
FROM ROADWAY**

- ⊗ BLOCK OUT CONCRETE 50 mm EACH SIDE FOR JOINT OPENING
- JOINT OPENING DIM. ALONG SKEW PLUS 15 mm

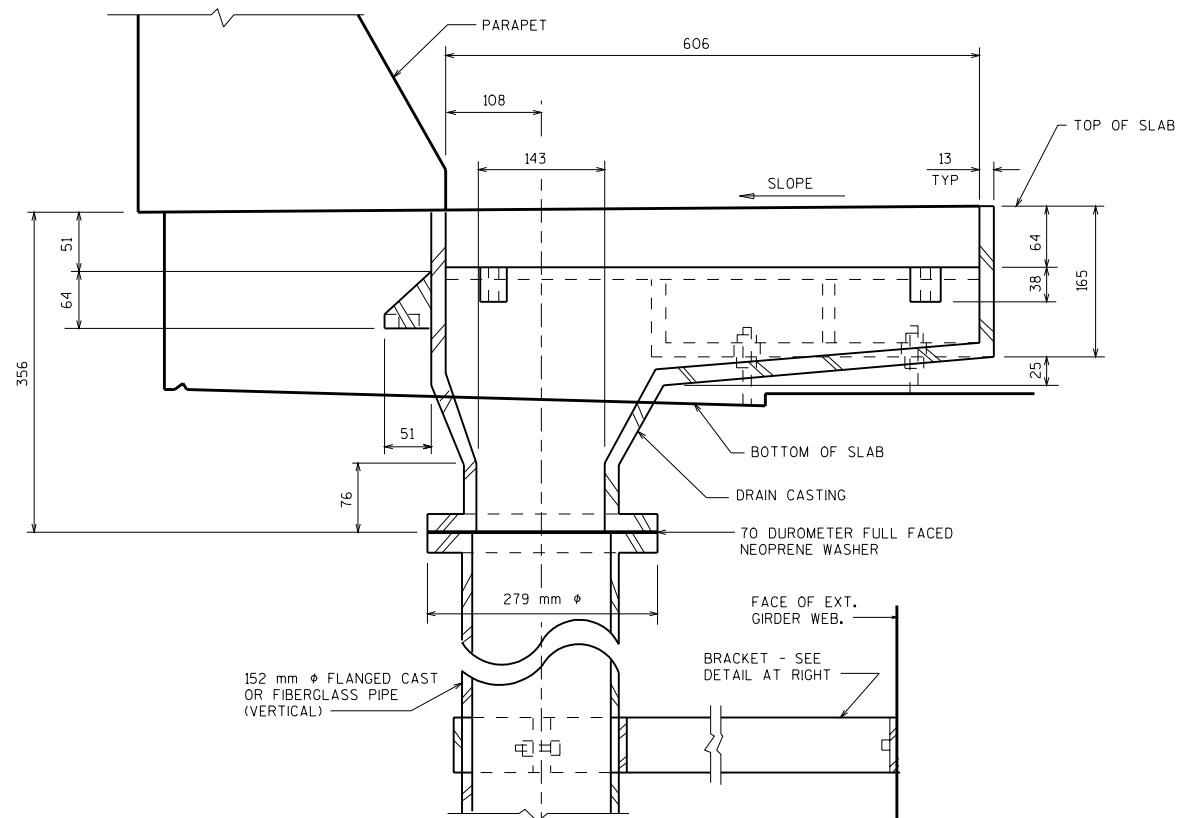
**STRIP SEAL COVER
PLATE DETAILS**

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APPROVED: _____ DATE: 1-02

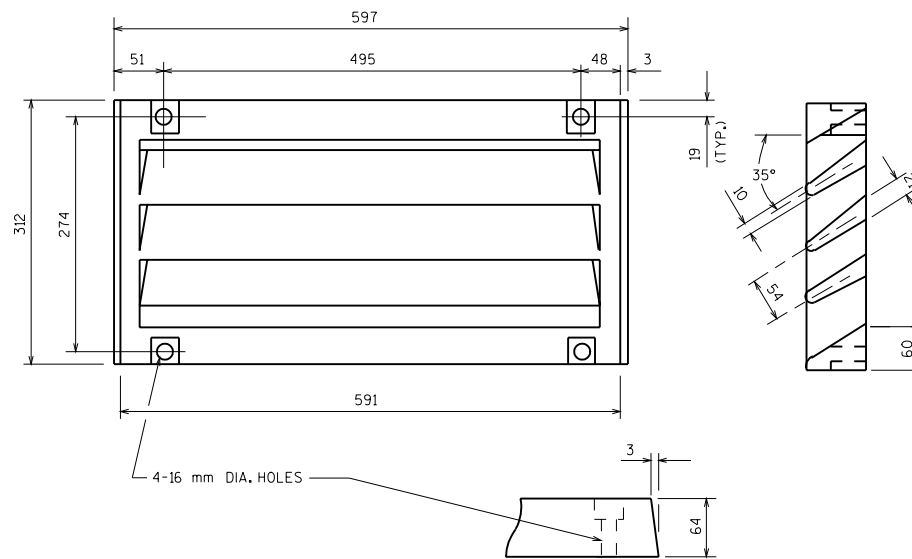


PLAN



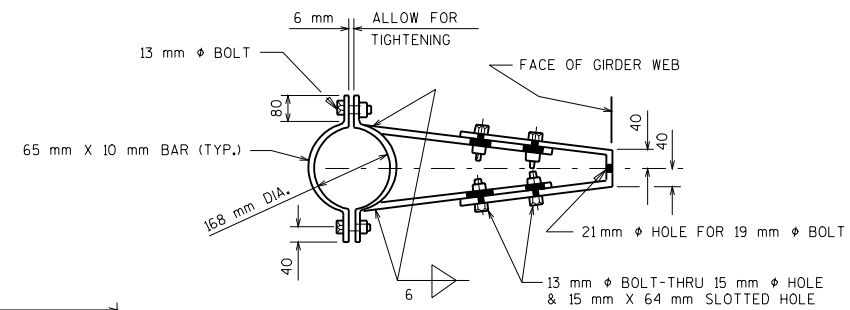
SECTION A1

TRANS. AND LONGIT. SLAB BAR REINF. TO BE CUT A MAX. OF 25 mm CL. FROM DRAIN FRAME. DISPLACE BARS WHERE POSSIBLE.

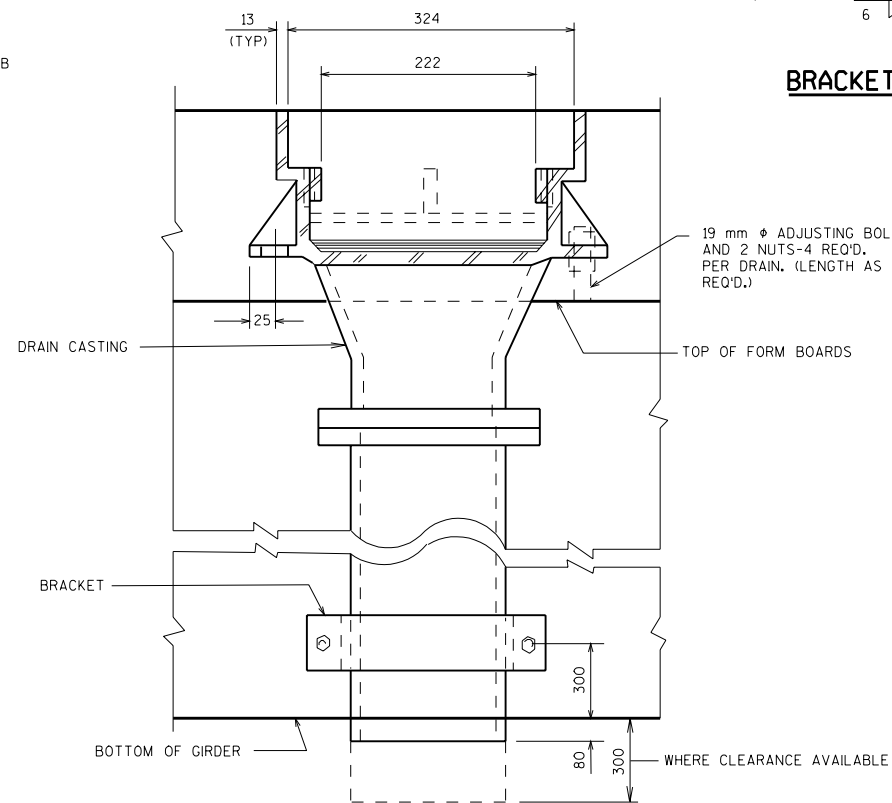


GRATE CASTING DETAIL

ATTACH GRATE TO FRAME FOR SHIPMENT



BRACKET DETAIL



SECTION A2

GENERAL NOTES

ALL MATERIAL FOR TYPE "GC" CASTING, EXCLUDING GRATE HOLD DOWN SCREWS, SHALL BE GRAY IRON CONFORMING TO ASTM A48, CLASS 30. (APPROXIMATE MASS = 102 kg)

MATERIAL FOR BRACKETS SHALL CONFORM TO ASTM A36M.

THE CONTRACTOR MAY PROPOSE AN ALTERNATE TYPE OF BRACKET. THE PROPOSED ALTERNATE DETAILS SHALL BE SUBMITTED AND SUBJECT TO THE APPROVAL OF THE ENGINEER.

FLANGED 152 mm DIA. DOWNSPOUTS SHALL BE EITHER CAST MATERIAL OR FIBERGLASS CONFORMING TO ASTM D2996, GRADE 1, CLASS A.

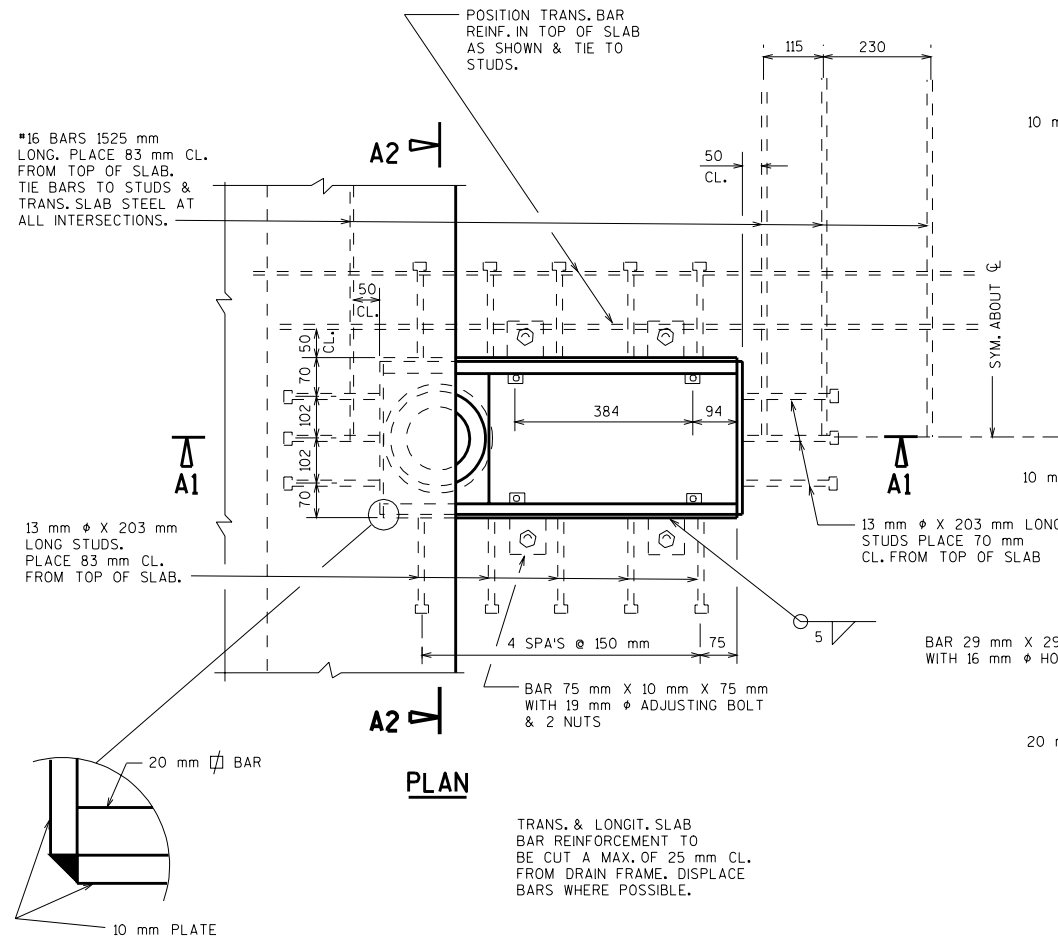
ALL DIMENSIONS ARE IN MILLIMETERS.

**FLOOR DRAIN
TYPE "GC"**

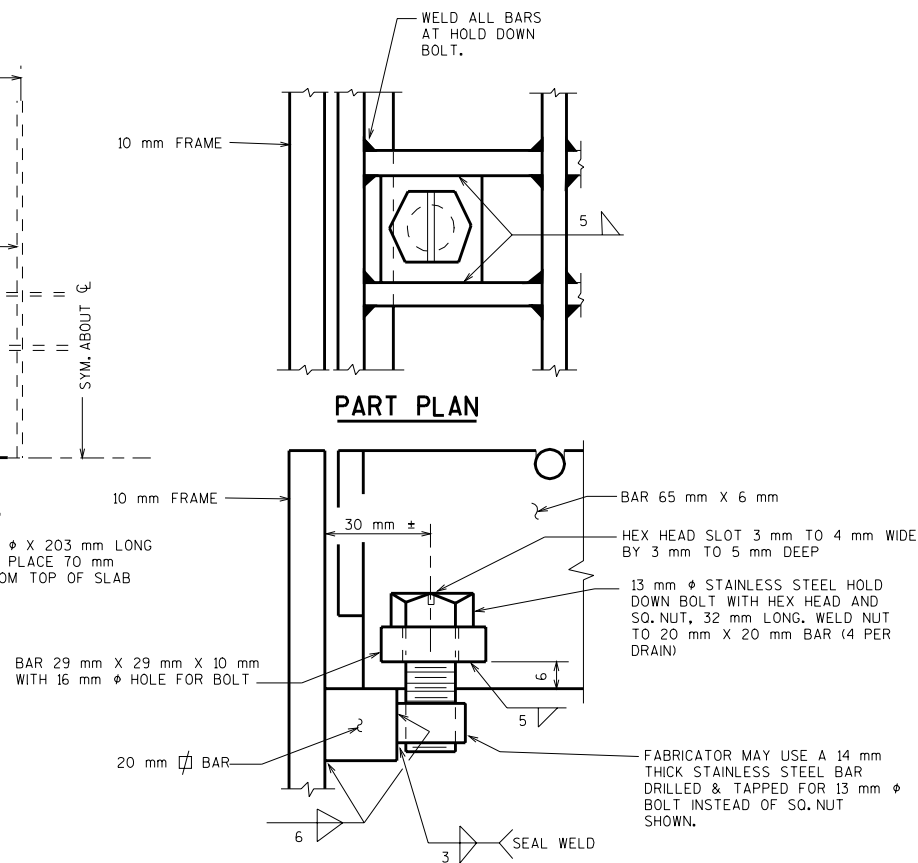
STATE OF WISCONSIN
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APPROVED: _____

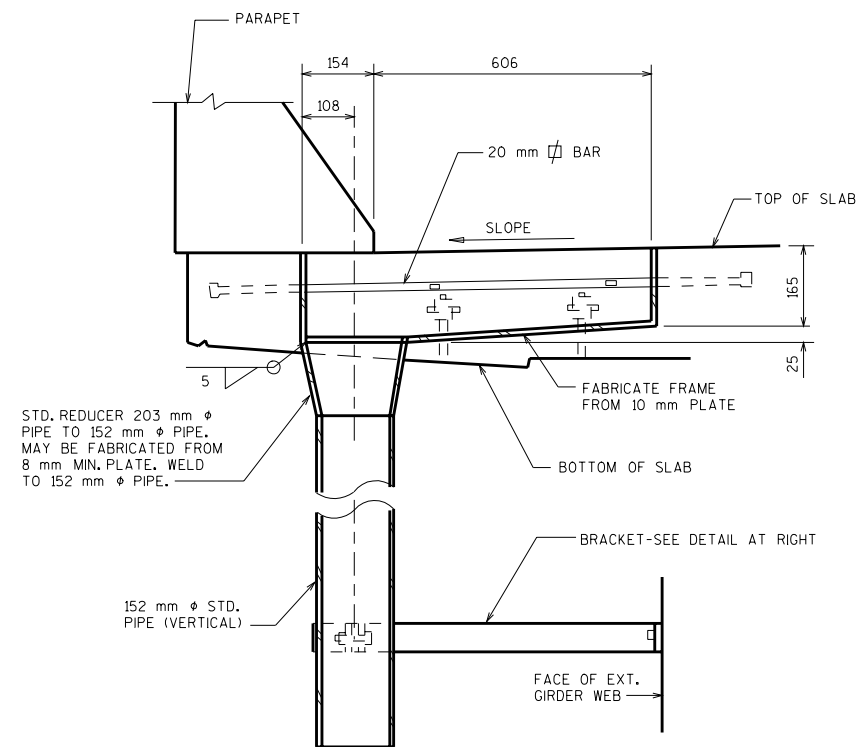
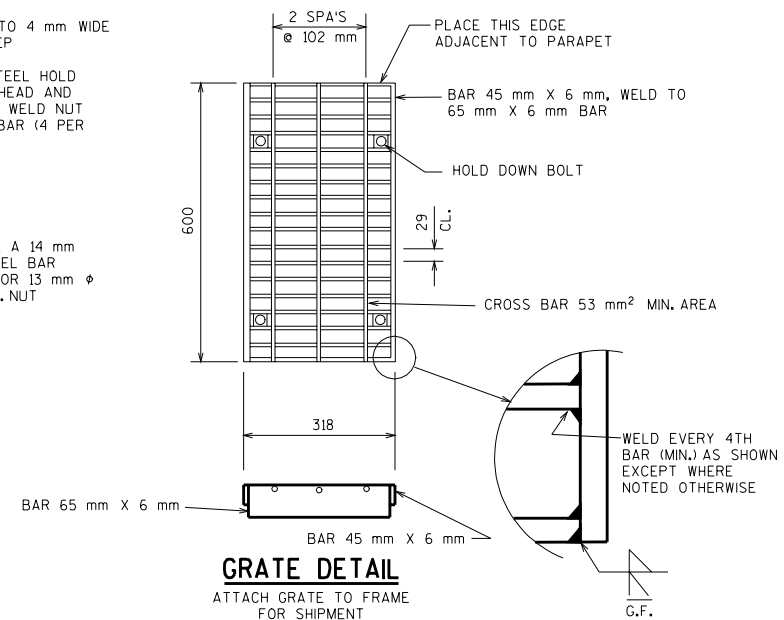
DATE:
1/99



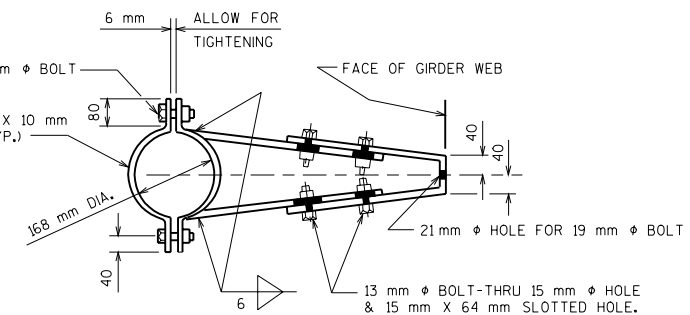
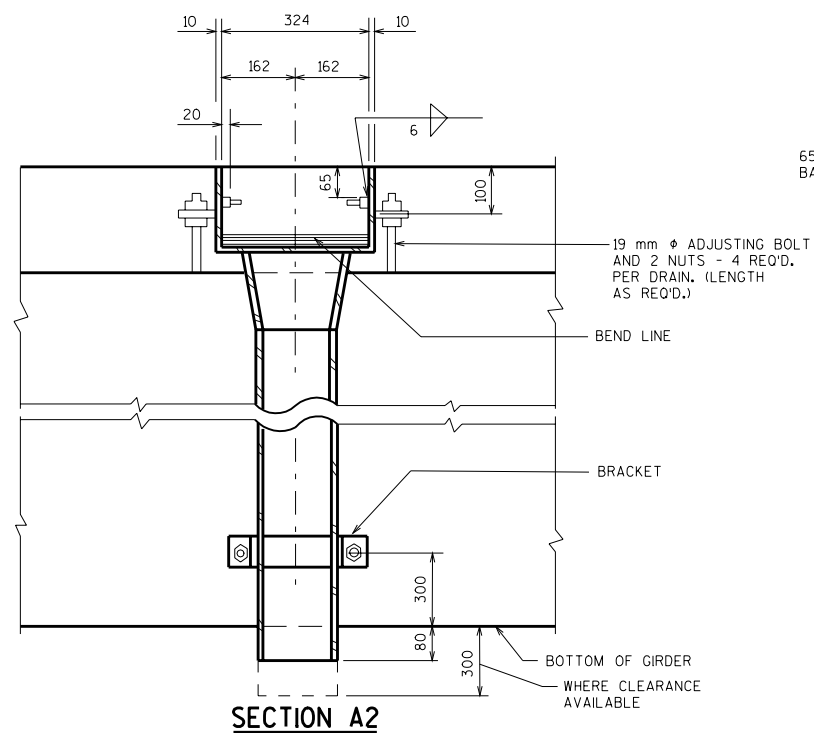
PLAN



SECTION AT HOLD DOWN BOLT



SECTION A1



GENERAL NOTES

ALL DRAIN MATERIAL INCLUDING GRATE, EXCLUDING PIPE & GRATE HOLD DOWN BOLTS, SHALL BE ASTM A36M STEEL.

ALL STEEL SHALL BE GALVANIZED. WELDS SHALL BE MADE WITH LOW HYDROGEN ELECTRODES.

SEAL WELD INSIDE OF DRAIN.

THE CONTRACTOR MAY PROPOSE AN ALTERNATE TYPE OF BRACKET. THE PROPOSED ALTERNATE DETAILS SHALL BE SUBMITTED AND SUBJECT TO THE APPROVAL OF THE ENGINEER.

FLANGED 152 mm ϕ FIBERGLASS PIPE CONFORMING TO ASTM D2996, GRADE 1, CLASS A, MAY BE USED AS AN ALTERNATE TO GALVANIZED STD. PIPE CONFORMING TO ASTM A53.

PRIOR TO GALVANIZING A NO. 6 BLAST CLEANING IS REQ'D.

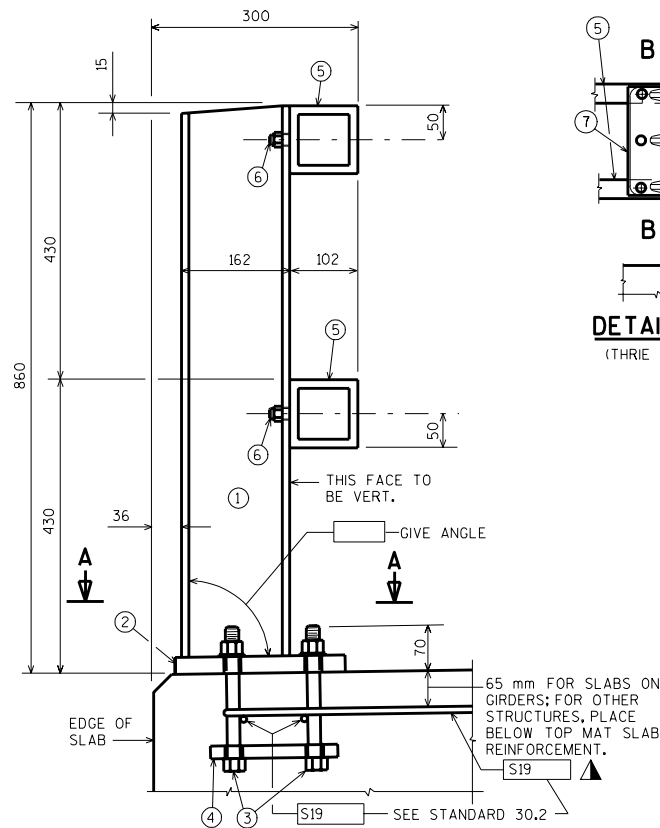
ALL DIMENSIONS ARE IN MILLIMETERS.

**FLOOR DRAIN
TYPE "H"**

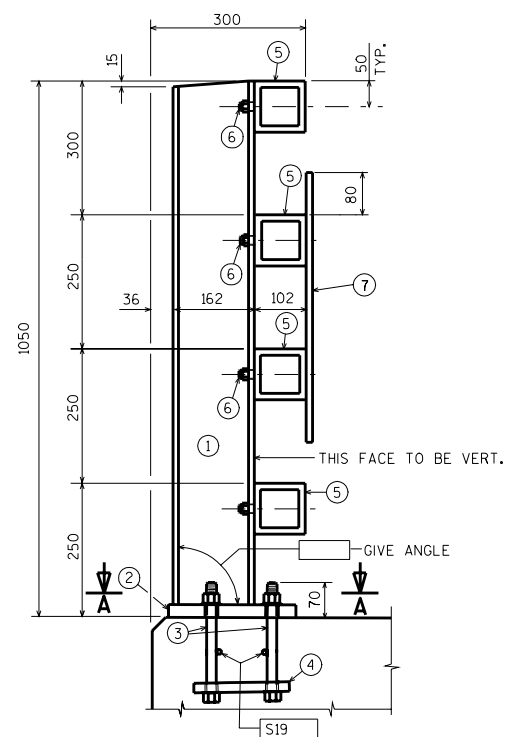
STATE OF WISCONSIN
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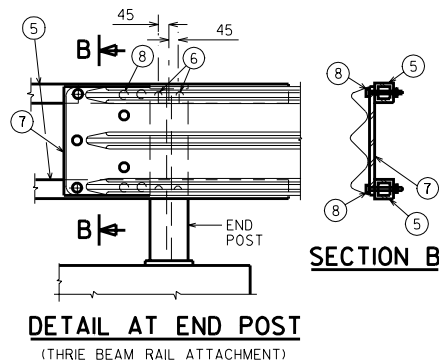
DATE:
1/99



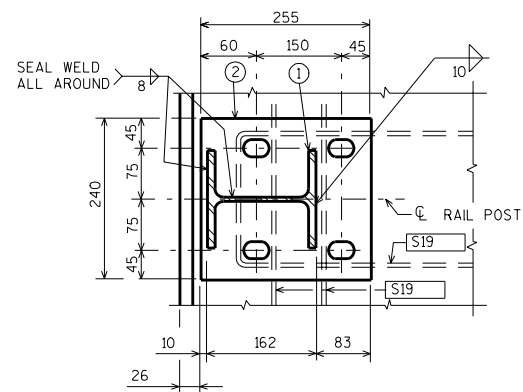
SECTION THRU RAILING ON DECK



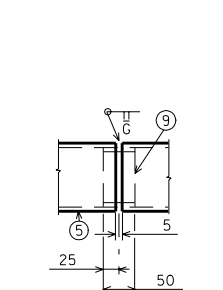
SECTION THRU RAILING ON SIDEWALK



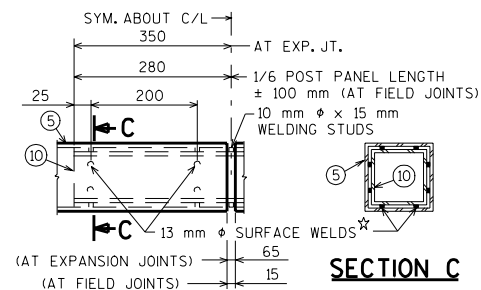
DETAIL AT END POST
(THRIE BEAM RAIL ATTACHMENT)



SECTION A

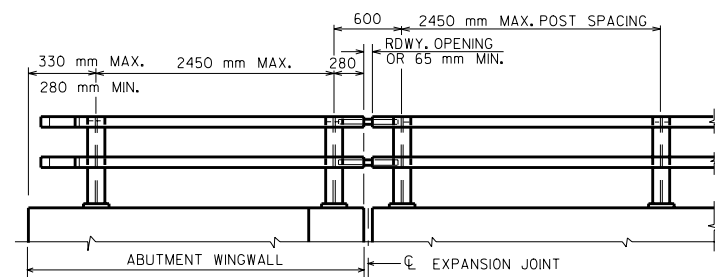


SHOP RAIL SPLICE DETAIL
(LOCATION MUST BE SHOWN ON SHOP DRAWINGS)

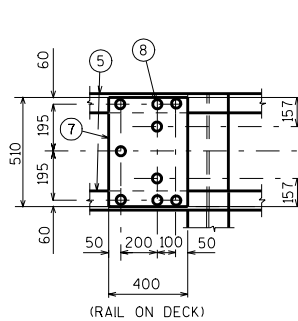


FIELD ERECTION JOINT DETAIL

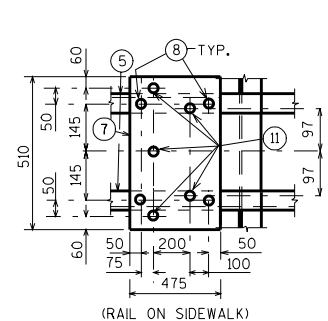
☆ MIN. 15 mm FLAT SURFACE DIA. PUNCHINGS OR STUDS MAY BE USED AS AN ALTERNATE.



PART ELEVATION OF RAILING

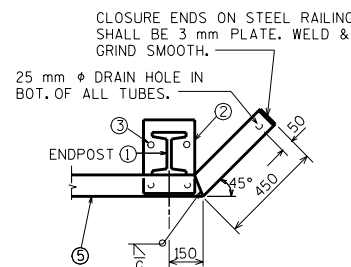


SECTION B



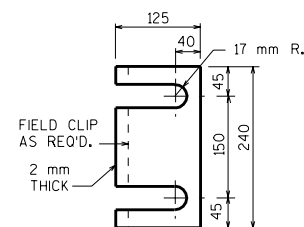
DETAIL FOR END POSTS

WITH THRIE BEAM RAIL ATTACHMENT
(END POST MAY BE LOCATED ON SUPERSTRUCTURE OR WINGWALLS)

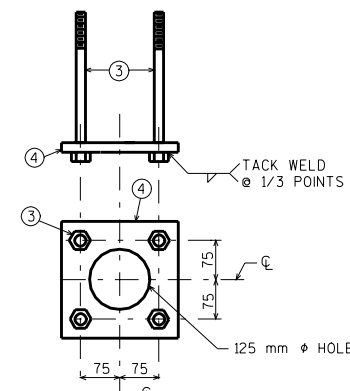


DETAIL FOR END POSTS

WITHOUT THRIE BEAM RAIL ATTACHMENT
(END POST MAY BE LOCATED ON SUPERSTRUCTURE OR WINGWALLS)



POST SHIM DETAIL
(4 PER POST)



ANCHORAGE DETAIL

LEGEND

- W150 x 37 WITH 35 mm DIA. HOLES ON EACH SIDE OF POST FOR STUD NO. 6. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY (OR SIDEWALK, AS APPLICABLE). PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- PLATE 25 mm x 240 mm x 255 mm WITH 27 mm x 40 mm SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN.
- A325M - M22 HEX BOLTS (GALVANIZED) WITH A325M NUT & WASHER, 350 mm LONG AT END POSTS AND AT POSTS ON CONCRETE SLAB SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS > 375 mm. USE 200 mm LONG AT ALL OTHER LOCATIONS. 4 REQ'D. PER POST. THREAD 75 mm AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING.
- 6 mm x 200 mm x 200 mm FLAT BAR WITH 24 mm DIA. HOLES FOR ANCHOR BOLTS NO. 3.
- TS 102 x 102 x 6.4 STRUCTURAL TUBING, CONFORMING TO A.S.T.M. DESIGNATION A501 OR A500 GRADE B. ATTACH TO NO. 1 WITH STUDS NO. 6.
- 16 mm DIA. x 40 mm LONG SHOP WELDED STUDS WITH HEX NUT AND 50 mm WASHERS (2 REQ'D. AT EACH RAIL TO POST LOCATION).
- PLATE 10 mm x 400 mm (475 mm ON SDWK.) x 510 mm. BOLT TO RAIL AS SHOWN IN DETAIL. REQUIRED AT THRIE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5.
- 25 mm DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5 FOR M22 A325M BOLTS W/HEX NUTS AND WASHERS.
- SQUARE SLEEVE FABRICATED FROM 6 mm PLATE. PROVIDE "SLIDING FIT" WITH A MINIMUM OUT TO OUT DIMENSION OF 87mm.
- TS 76 x 76 x 6.4 x (700 mm AT EXPANSION JOINTS) & (560 mm AT FIELD JOINTS) LONG. PROVIDE 13 mm DIA. SURFACE WELDS ON ALL SIDES AS SHOWN. GRIND WELDS TO FIT FREE INTO I.D. OF NO. 5. PROVIDE 10 mm DIA. x 15 mm WELDING STUDS ON TOP AND BOTTOM SURFACES AT CENTERLINE.
- 22 mm DIA. x 40 mm LONG THREADED SHOP WELDED STUDS. (REQ'D. FOR SDWK. RAIL ONLY.)

GENERAL NOTES

BID ITEM SHALL BE "TUBULAR RAILING TYPE 'F'", WHICH INCLUDES ALL ITEMS SHOWN.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE 3 OR 4 POSTS.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

FOR RAILING NOT TO BE PAINTED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 4) SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.

FOR RAILING TO BE PAINTED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 3 & 4) SHALL BE PAINTED WITH A THREE-COAT ZINC RICH EPOXY SYSTEM. PRIOR TO PAINTING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 11 NEAR WHITE BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.

ALL MATERIALS USED IN FABRICATION SHALL BE MADE FROM MATERIALS CONFORMING TO ASTM A709M GRADE 250 UNLESS NOTED OTHERWISE.

FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQ'D. FOR ALIGNMENT.

ALL DIMENSIONS ARE IN MILLIMETERS

▲ TIE TO TOP MAT OF STEEL.

TUBULAR STEEL RAILING TYPE 'F'

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7/01

⊗ PAY LIMITS FOR TYPE "W" STEEL RAILING.

ELEVATION OF RAILING

- ① W 150 x 37 WITH 19 mm x 65 mm VERT. SLOTS IN FLG. HOLES ON OTHER SIDE OF WEB IS OPTIONAL FOR NO. 7. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POSTS VERTICAL AND NORMAL TO GRADE LINE.
- ② C 200 x 17 WITH 21 mm DIA. HOLES FOR NO. 8.
- ③ BASE PLATE 25 mm x 240 mm x 255 mm WITH 27 mm x 40 mm SLOTTED HOLES FOR ANCHOR BOLTS NO. 4. WELD TO NO. 1 AS SHOWN.
- ④ A325M - M22 HEX BOLTS (GALVANIZED) WITH A325M NUT AND WASHER, 350 mm LONG AT END POSTS AND AT POSTS ON CONCRETE SLAB SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS > 375 mm. USE 200 mm LONG AT ALL OTHER LOCATIONS. 4 REQ'D. PER POST. THREAD 75 mm AND PLACE NORMAL TO PLATE NO. 3. CHAMFER TOP OF BOLTS BEFORE THREADING.
- ⑤ 6 mm x 200 mm x 200 mm FLAT BAR, WITH 24 mm DIA. HOLES FOR ANCHOR BOLTS NO. 4.
- ⑥ 44 mm x 75 mm MOUNTING BOLT WASHER (GALVANIZED.)
- ⑦ 16 mm DIA. BUTTON HEAD POST MOUNTING BOLT WITH ROUND WASHER AND NUT.
- ⑧ 16 mm DIA. x 50 mm HEX BOLTS WITH NUT AND TWO WASHERS EACH.
- ⑨ PLATE 14 mm x 145 mm x 150 mm AT BASIC POST CONNECTION. 32 mm DIA. HOLES IN PLATE, 21 mm DIA. HOLES IN CHANNEL.
- ⑩ PLATE 14 mm x 145 mm x 370 mm, 32 mm DIA. HOLES IN PLATE, 21 mm DIA. HOLES IN CHANNEL. EXPANSION SLOTS ON JOINT SIDE OF POST, 27 mm x 60 mm IN PLATE, 21 mm x 60 mm IN CHANNEL. (AT EXPANSION SPLICE.)
- ⑪ PLATE 14 mm x 145 mm x 300 mm, 32 mm DIA. HOLES IN PLATE, 21 mm DIA. HOLES IN CHANNEL. (AT TYPICAL SPLICE.)

BID ITEM SHALL BE STEEL RAILING TYPE"W" WHICH INCLUDES ALL ITEMS SHOWN.

ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 5)
SHALL BE GALVANIZED AFTER FABRICATION.

ALL MATERIAL USED IN FABRICATION SHALL BE
MADE FROM MATERIALS CONFORMING TO A.S.T.M.
DESIGNATION A709M GRADE 250 UNLESS NOTED
OTHERWISE.

PAY LIMITS FOR "GUARD RAIL" SHALL BE FROM
 £ TO £ OF END POSTS.

CHANNEL MEMBER SHALL BE ATTACHED CONTINUOUSLY TO A MINIMUM OF FOUR POSTS AND A MAXIMUM OF EIGHT (EXCEPT AT ABUTMENTS).

STEEL POST SHIMS MAY BE USED UNDER POSTS
WHERE REQ'D. FOR ALIGNMENT.

ALL DIMENSIONS ARE IN MILLIMETERS.

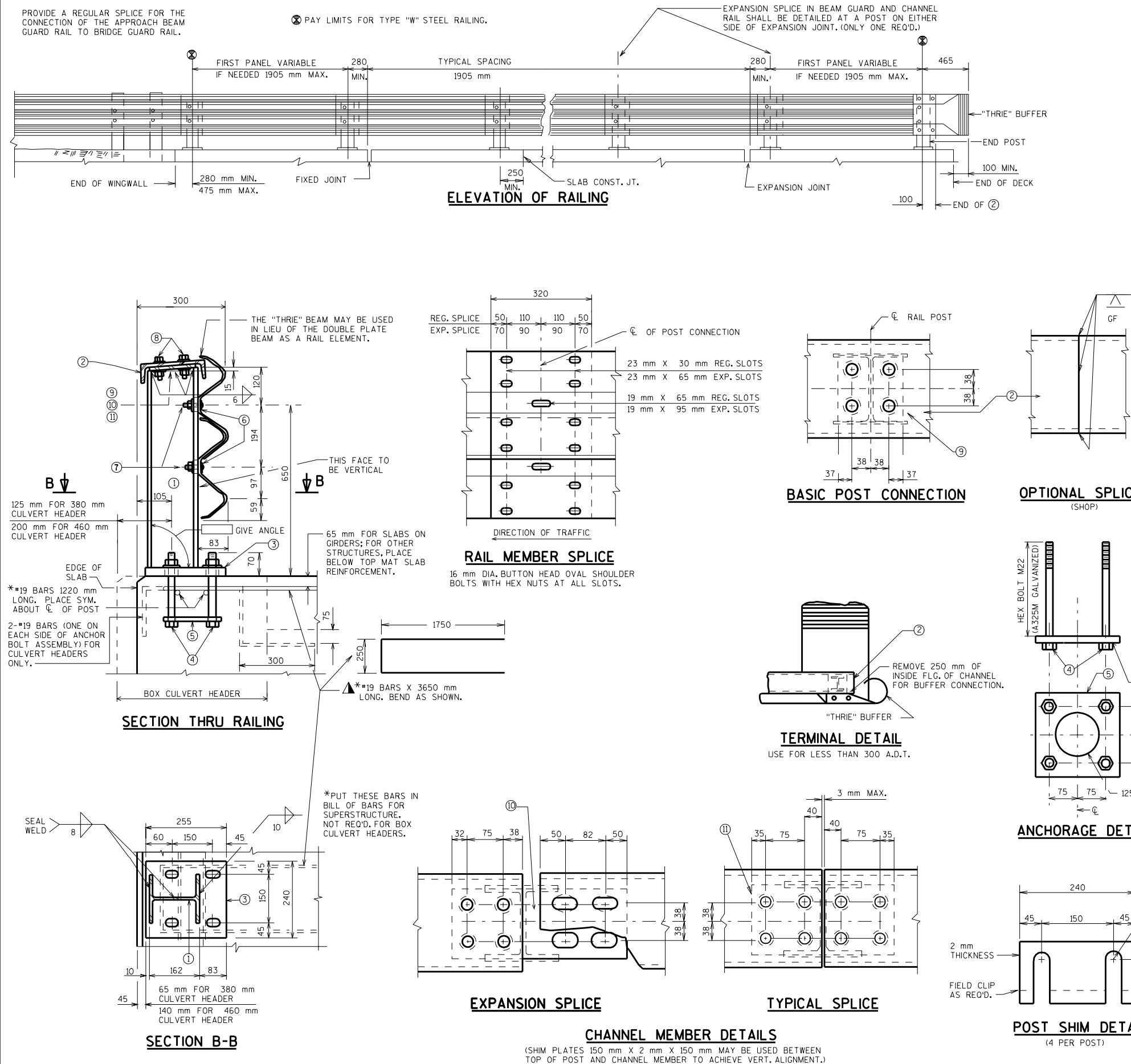
 TIE TO TOP MAT OF STEEL

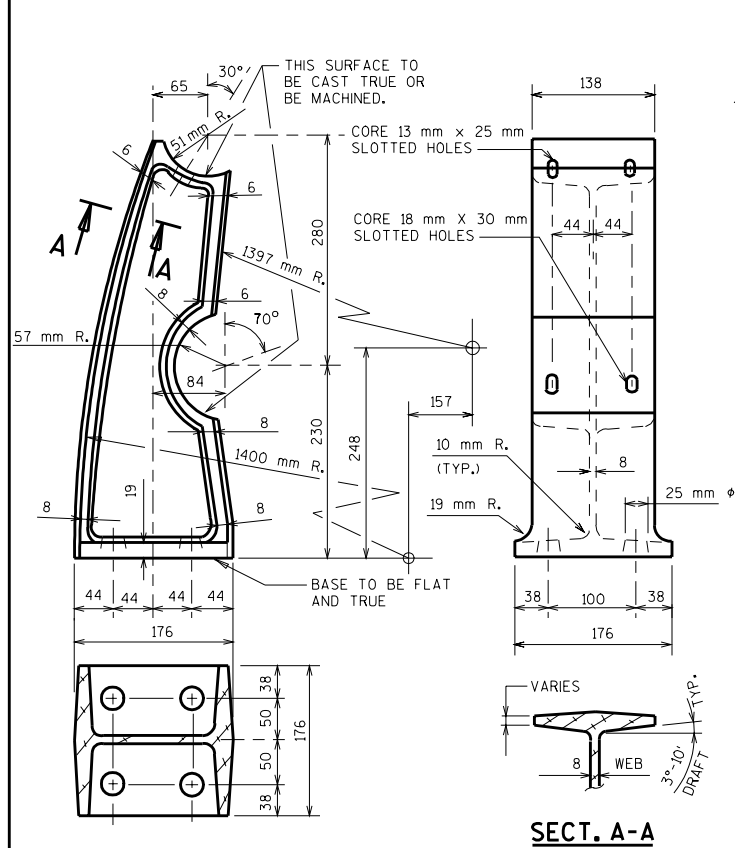
APPROX. RAILING MASS = 67 kg/m

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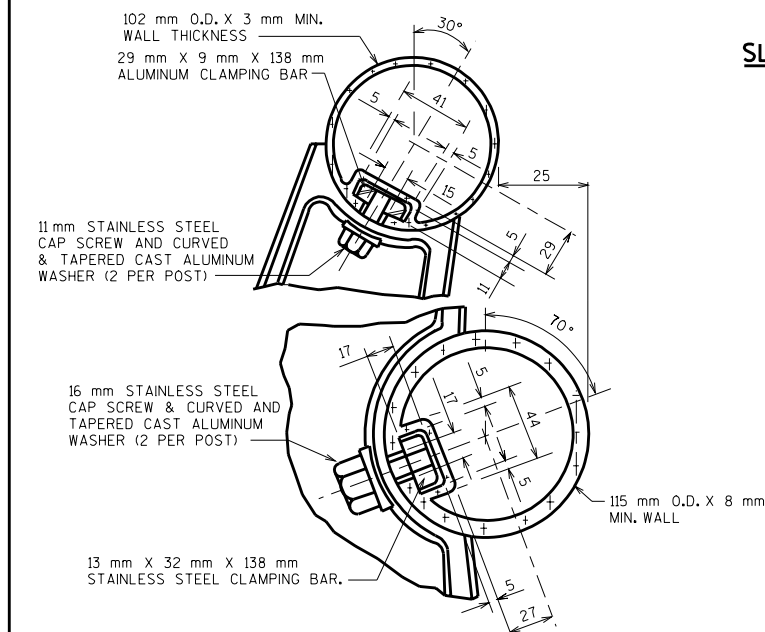
APPROVED: _____	DATE: 7/01
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METRIC STANDARD 30.2



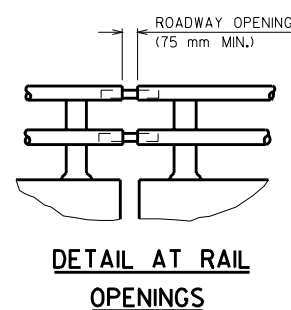
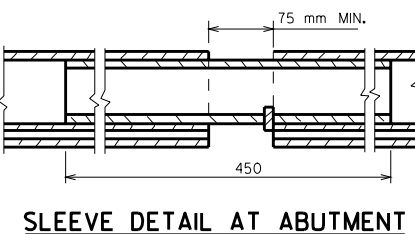
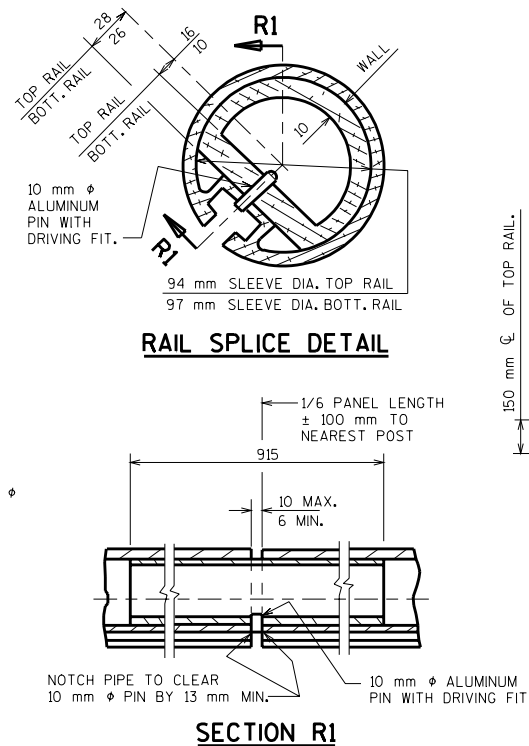


ALUMINUM POST CASTING

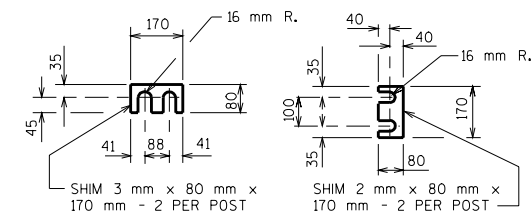
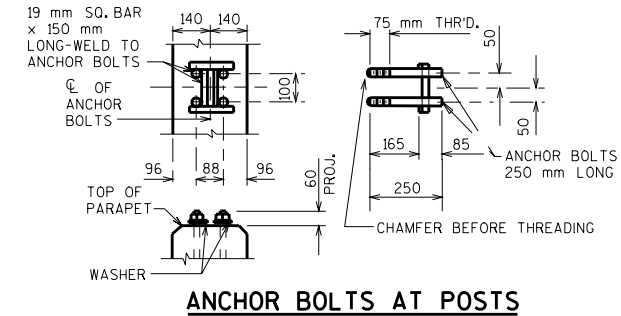
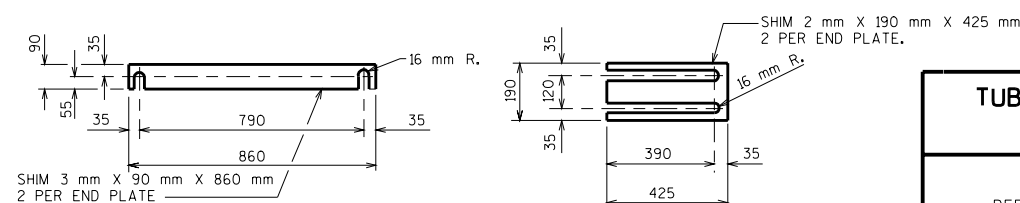
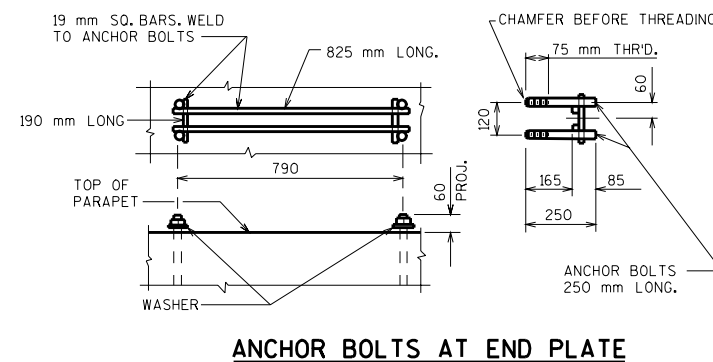
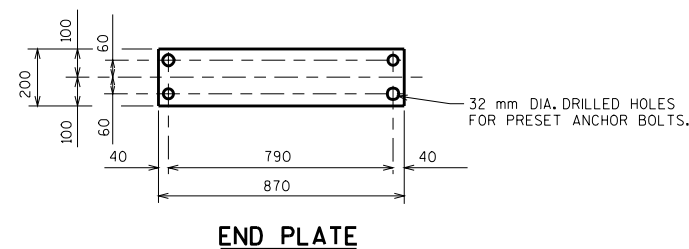
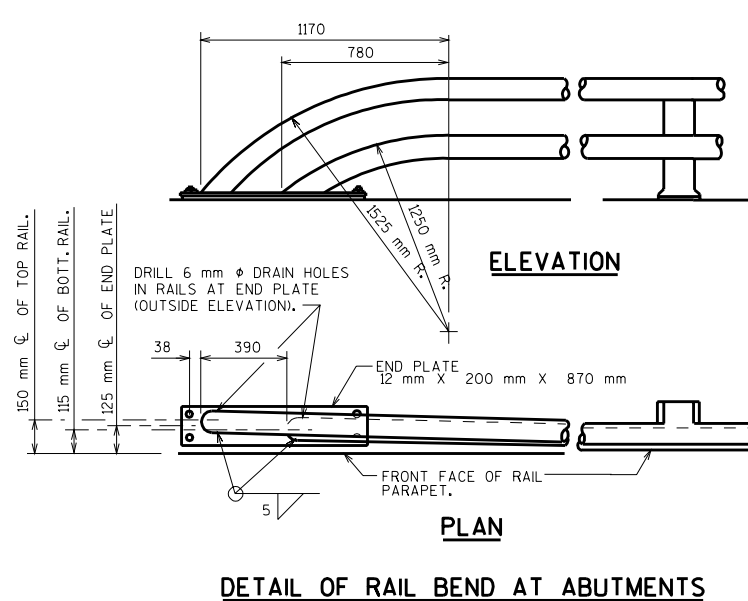


DETAIL OF ATTACHMENT TO POST

NOTES: MAX. REDUCTION IN DIAMETER OF BENT SECTION SHALL BE 3%. WALL THICKNESS OF TUBING SHOWN ABOVE SHALL BE MIN. NOMINAL AVERAGE WALL THICKNESS. MAX. REDUCTION IN SLOT WIDTH IN BENT TUBING SHALL BE 5 mm.



ALL SLEEVE DETAILS SAME AS "RAIL SPLICE DETAIL" UNLESS SHOWN OTHERWISE



GENERAL NOTES

BID ITEM SHALL BE TUBULAR RAILING, TYPE "H" WHICH INCLUDES ALL ITEMS SHOWN.

THE SHANK AND ROOT DIAMETER OF THREAD FOR ANCHOR BOLTS SHALL BE A MIN. OF 16 mm.

SHIMS SHALL CONFORM TO SAME MATERIAL AS POSTS.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL.

RAILINGS SHALL BE FABRICATED IN 2 AND 3 PANEL LENGTHS.

RAILING POSTS SHALL BE SET NORMAL TO GRADE LINE.

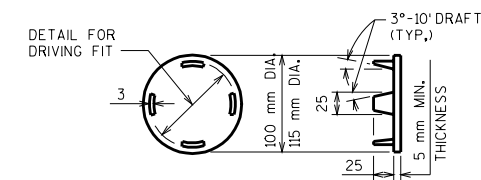
ALL POST SPACINGS ARE MEASURED HORIZONTALLY ALONG CENTERLINE OF THE POST BASE.

SHIMS SHALL BE USED UNDER POSTS AND END PLATES WHERE REQ'D. FOR ALIGNMENT.

FILL ALL EXPOSED OPENINGS BETWEEN SHIMS AND POST ANCHOR BOLT HOLES WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

RAILS SHALL BE BUILT STRAIGHT AND SPRUNG INTO PLACE FOR STRUCTURES CURVED UP TO 3°. FOR STRUCTURES CURVED GREATER THAN 3°, RAILS SHALL BE CURVED TO FIT.

ALL DIMENSION ARE IN MILLIMETERS.

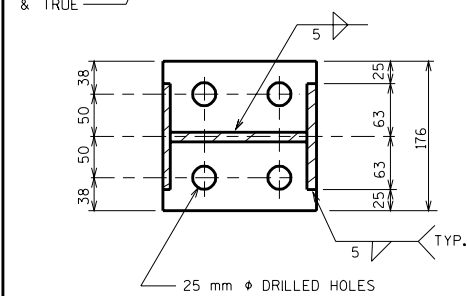


TUBULAR RAILING TYPE "H" (ALUM.)

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1/03



EACH POST:
 4 - 16 mm x 38 mm
 THREADED STUDS
 WELDED TO RAIL

4 - 19 mm STD. WASHERS (BENT)
 & 4 - 16 mm HEX NUTS

60 mm R

280
 230

ALL SLEEVE DETAILS SAME AS
 "FIELD ERECTION JOINT DETAIL"
 UNLESS SHOWN OTHERWISE

19 mm ϕ STD. PIPE (TYP)

120

31 44

31

70

31 41

BAR 6 mm \times 150 mm \times 320 mm
WITH 6 - 17 mm ϕ HOLES
(90. mm GAGE)

89 mm ϕ STANDARD PIPE

102 mm ϕ EXTRA STRONG PIPE

13 TYP.

280 mm TYP. 280 mm TYP.

75 TYP.

25 200 100 200 25

DETAIL AT RAIL
OPENING

38

390

END PLATE
12 mm X 200 mm X 870 mm
WITH 50 mm ϕ VENT HOLES

150 mm ϕ OF TOP RAIL.

125 mm ϕ OF END PLATE

115 mm ϕ OF BOTT. RAIL.

5

FRONT FACE OF RAIL
PARAPET.

PLAN

DETAIL OF RAIL BEND AT ABUTMENTS

Technical drawing of the End Plate showing dimensions and hole specifications:

- Overall width: 870
- Overall height: 200
- Distance from top edge to center of top holes: 100
- Distance between centers of top holes: 100
- Distance from bottom edge to center of bottom holes: 100
- Distance between centers of bottom holes: 100
- Distance from left edge to center of left holes: 40
- Distance between centers of left holes: 790
- Distance from right edge to center of right holes: 40
- Hole specification: 32 mm DIA. DRILLED HOLES FOR PRESET ANCHOR BOLTS.

19 mm SQ. BARS, WELD TO ANCHOR BOLTS.

825 mm LONG.

190 mm LONG

790

60 PROJ.

TOP OF PARAPET

WASHER

CHAMFER BEFORE THREADING

75 mm THR'D.

120

60

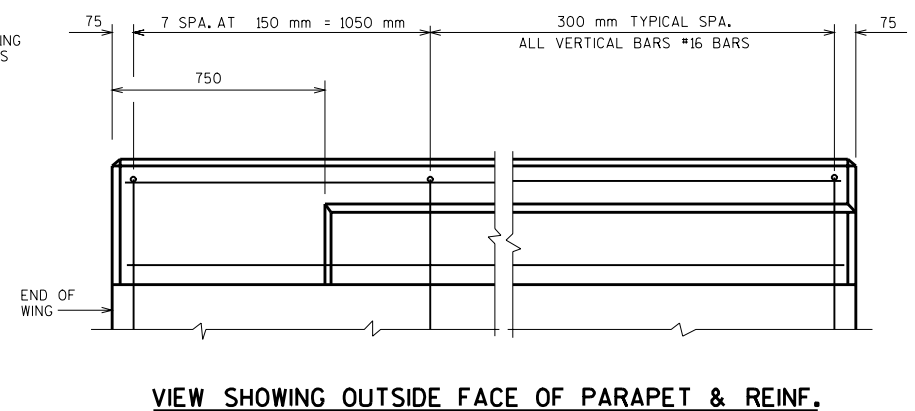
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85

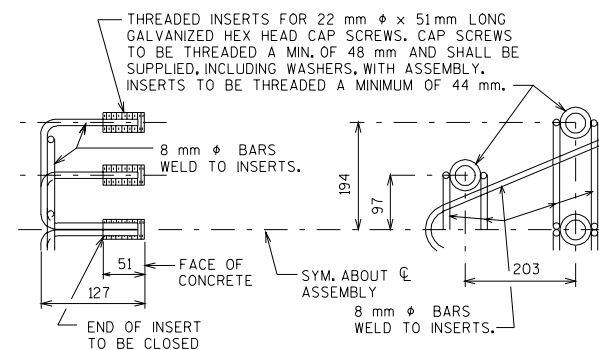
250

ANCHOR BOLTS 250 mm LONG.

○ 8 mm x 10 mm WELDED STUDS
 ⬡ 76 mm ϕ STD. PIPE x 560 mm LONG
 □ 76 mm ϕ EXTRA STRONG PIPE x 560 mm LONG
 △ 13 mm ϕ WELD BEADS AT 1/3 PTS. ON PIPE
 280 mm CIRCUMF. GRIND BEADS SO THAT
 SLEEVE FITS FREELY IN THE I.D. OF 102 mm ϕ
 EXTRA STRONG PIPE.



VIEW SHOWING OUTSIDE FACE OF PARAPET & REINF.



DETAIL OF ANCHOR ASSEMBLY

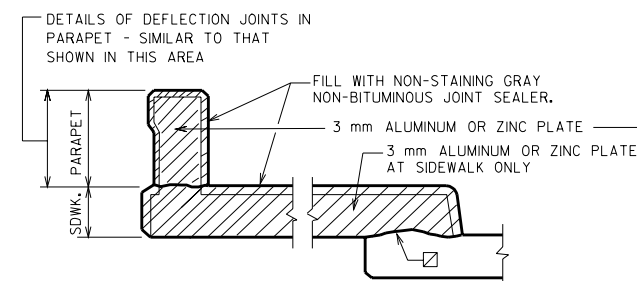
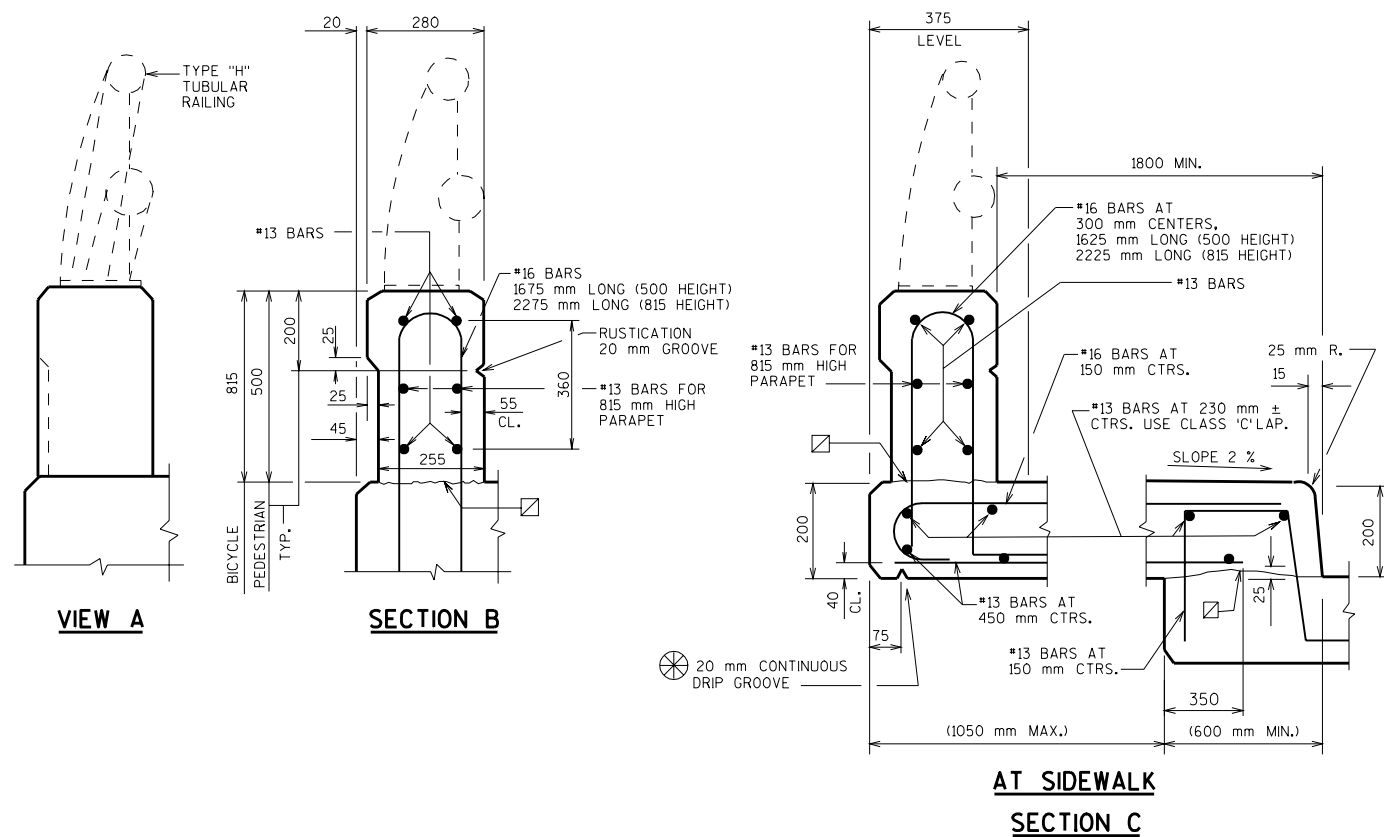
NOTE: HEX. HEAD CAP SCREWS & WASHERS TO BE GALVANIZED
IN ACCORDANCE WITH AASHTO M232 CLASS C.

ASSEMBLY SHALL BE BID ITEM "ANCHOR ASSEMBLY FOR BEAM GUARD", EACH.

NOTES

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF 3 mm ZINC OR ALUMINUM PLATE CUT AS SHOWN IN SECTION "D" BY SHADED AREA. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED AT THE DEFLECTION JOINTS, ONE SIDE OF JOINT SHALL BE COATED WITH BITUMINOUS PAINT AND PLATE SEPARATORS MAY BE OMITTED.

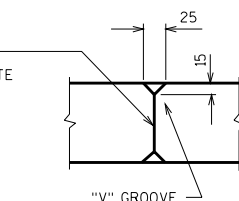
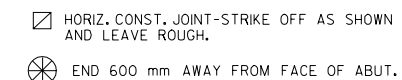
ALL DIMENSIONS ARE IN MILLIMETERS.



SECTION D

SHOWING DEFLECTION JOINT IN PARAPET OR
SIDEWALK USING THE FOLLOWING CRITERIA:

1. GIRDER STRUCTURES AND SLAB STRUCTURES WITH A SIDEWALK SHOULD HAVE A DEFLECTION JOINT IN THE SIDEWALK AND PARAPET OVER THE PIER.
2. GIRDER STRUCTURES AND SLAB STRUCTURES WITHOUT SIDEWALKS SHOULD HAVE NO DEFLECTION JOINTS IN THE PARAPETS.



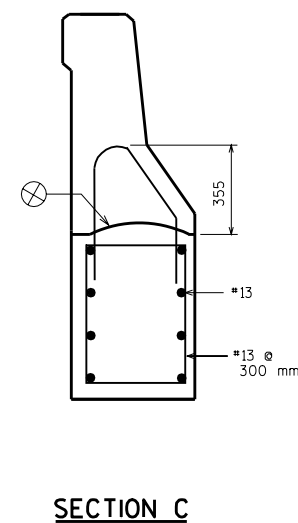
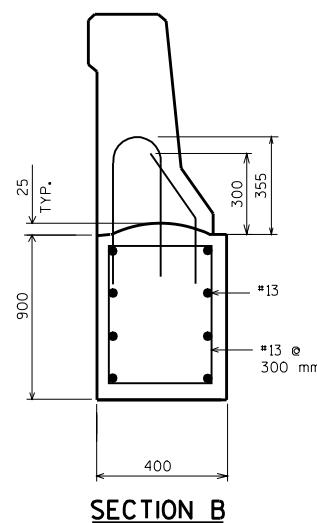
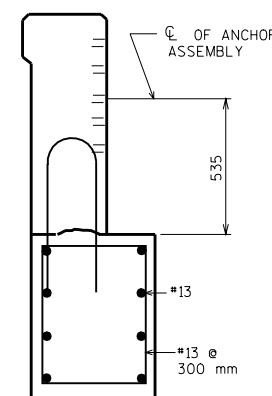
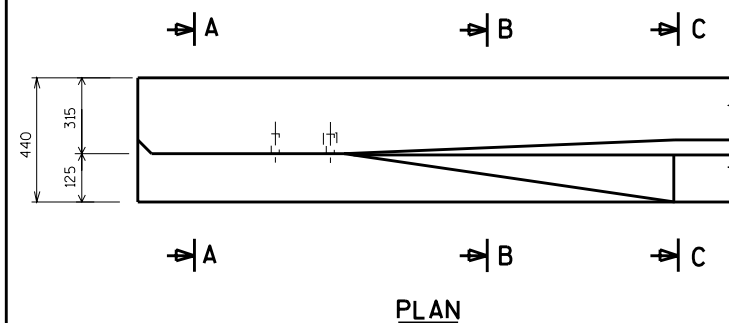
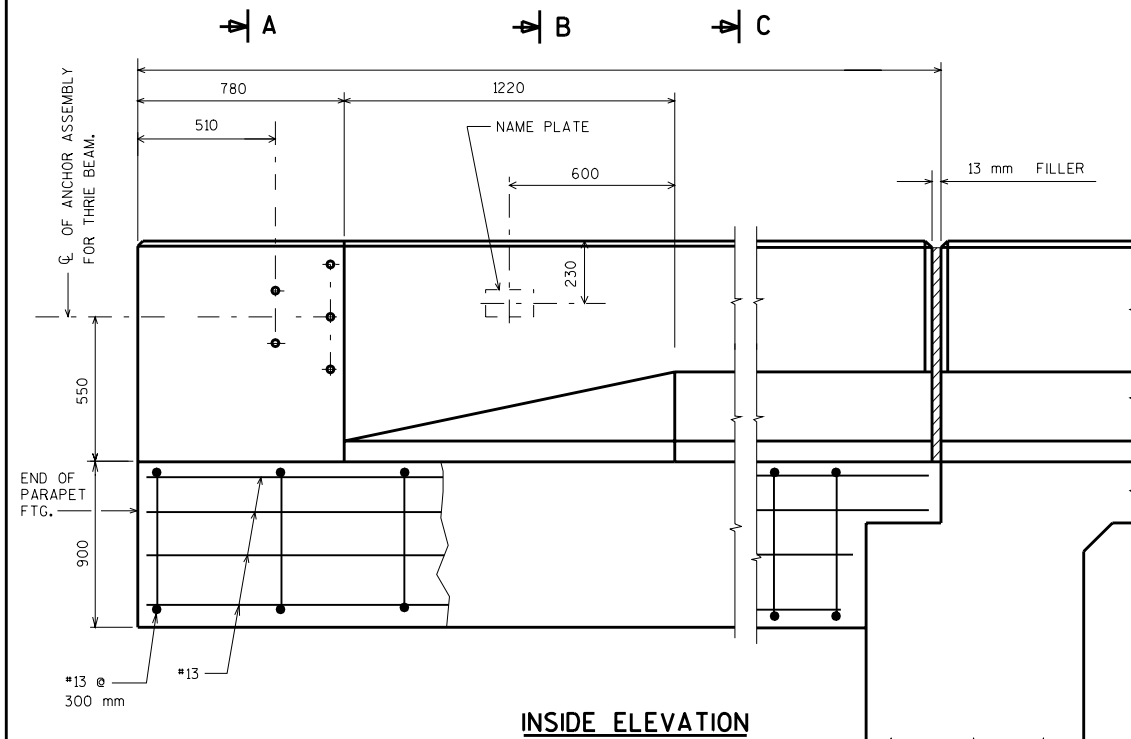
SECTION E

VERTICAL FACE
PARAPET 'A'

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED:

DATE:	1-03
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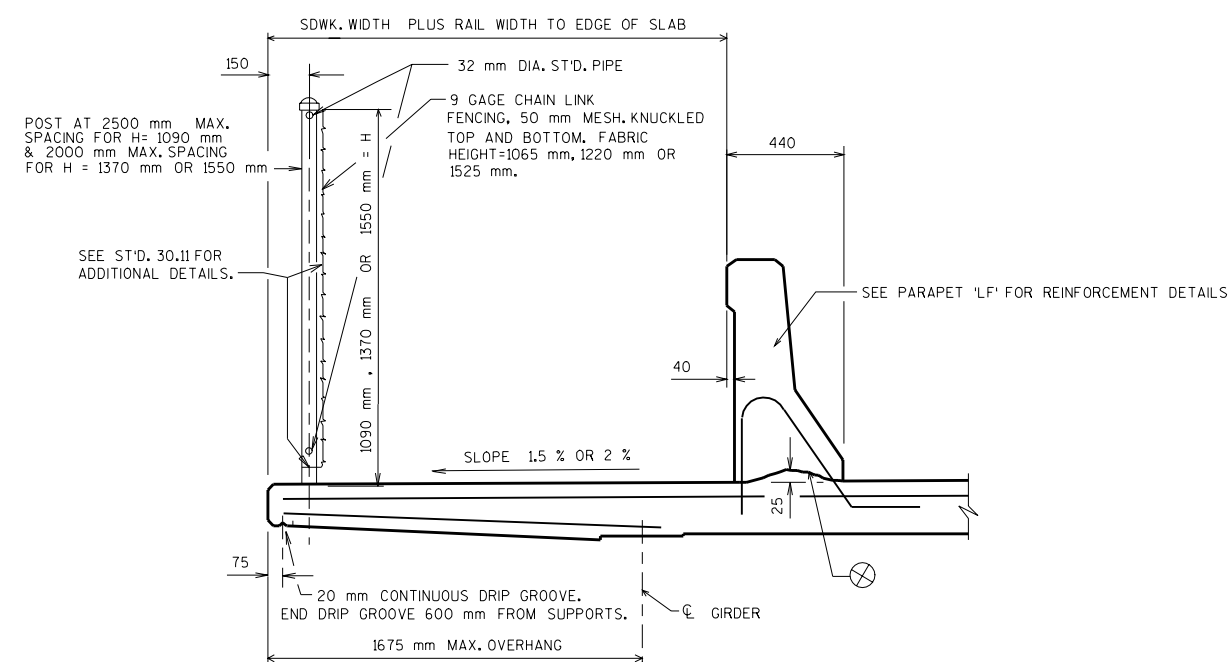
DESIGNER NOTES

FOR PARAPET 'LF' DETAILS & REINFORCING DETAILS
SEE SLOPED FACE PARAPET 'LF'. (STANDARD 30.12)

ALL PARAPET FOOTING BARS SHALL BE EPOXY COATED.

ALL DIMENSIONS ARE IN MILLIMETERS.

⊗ CONST. JT. - STRIKE OFF AS SHOWN & LEAVE ROUGH



PARAPET FOOTING

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1-03

METRIC STANDARD 30.10

GENERAL NOTES

POSTS ARE TO BE SET VERTICAL.

KNUCKLE TOP AND BOTTOM OF 50 mm MESH CHAIN LINK FENCING.

ALL FENCING COMPONENTS SHALL BE GALVANIZED STEEL OR APPROVED ALTERNATE LISTED BELOW.

ALL RAILS, POSTS AND SLEEVES ARE STANDARD WEIGHT PIPE, SCHEDULE 40.

PLACE ALL NUTS ON OUTSIDE OF FENCE.

TOP RAIL SHALL BE CONTINUOUS OVER INTERIOR POSTS. MINIMUM LENGTH OF TOP RAIL BETWEEN SPLICES SHALL BE 6096 mm. PLACE TOP RAIL SPLICES NEAR 1/4 POINTS OF POST SPACING. NO 9 GAGE TIES AT 230 mm SPACING REQ'D. ON RAILS & POSTS WITHOUT STRETCHER BARS.

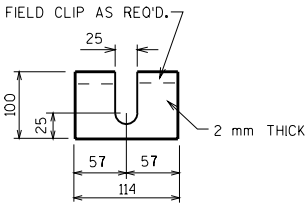
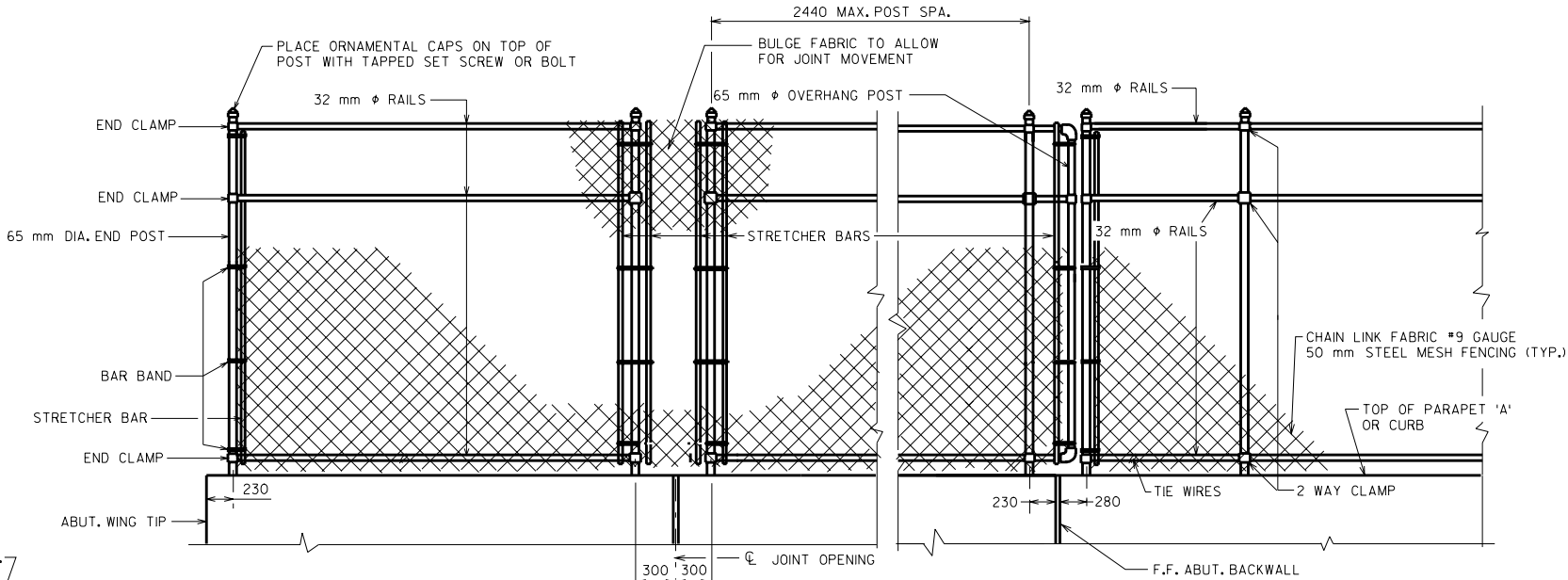
ALTERNATE FENCING MATERIALS ARE ALUMINUM, ALUMINUM COATED STEEL, AND APPROVED COLOR COATING SYSTEMS. IF ALTERNATE MATERIALS ARE USED FOR POSTS & RAILS, THESE ELEMENTS SHOULD BE DESIGNED.

PEDESTRIAN RAILING MAY BE USED ON WINGWALL PARAPETS IF CHAIN LINK FENCE DOES NOT CONTINUE BEYOND BRIDGE.

HANDRAILS SHALL BE USED ALONG BRIDGE SIDE-WALKS WHERE THE SLOPE OF THE SIDEWALK IS GREATER THAN 5%. TOP OF HANDRAIL GRIPPING SURFACES SHALL BE MOUNTED BETWEEN 760 mm & 865 mm ABOVE SIDEWALK SURFACE. USE 760 mm NEAR SCHOOL ZONES, IF FEASIBLE, HANDRAILS SHALL BE PROVIDED ALONG BOTH SIDES OF SIDE-WALK. FOR HANDRAIL DETAILS SEE STANDARD 37.2.

ALL DIMENSIONS ARE IN MILLIMETERS.

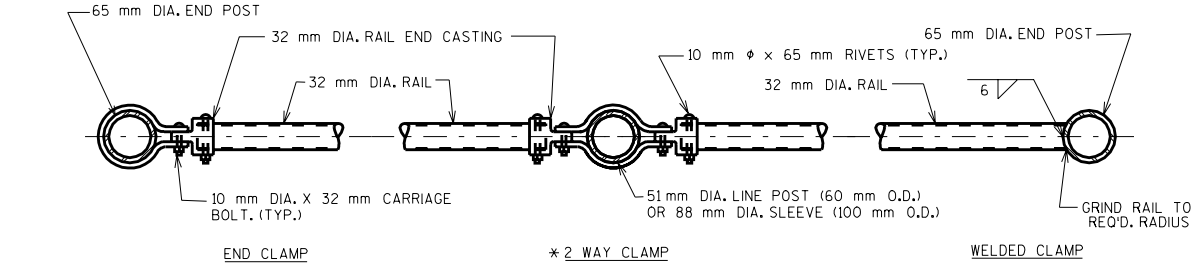
- * ALTERNATE BOULEVARD 2-WAY CLAMP MAY BE USED WHEN THE POST IS EITHER BOLTED TO THE 88 mm ϕ PIPE SLEEVE OR DIRECTLY WELDED TO THE BASE PLATE.
- ▲ 13 mm DIA. X 175 mm LONG GALVANIZED HEX BOLT WITH NUT & WASHER, TYPE S, 13 mm ϕ CONCRETE MASONRY ANCHORS MAY BE SUBSTITUTED FOR 13 mm ϕ BOLTS. ANCHOR PLATE NOT REQUIRED WHEN TYPE S ANCHORS ARE USED. SEE ☆
- ☆ 13 mm ϕ CONCRETE MASONRY ANCHOR, TYPE "S", 150 mm EMBEDMENT (EPOXY ANCHORED) MIN. PULLOUT OF 44.5 kN, THREADED LENGTH OF ANCHOR, WASHER, AND NUT SHALL BE GALVANIZED.



POST SHIM DETAILS

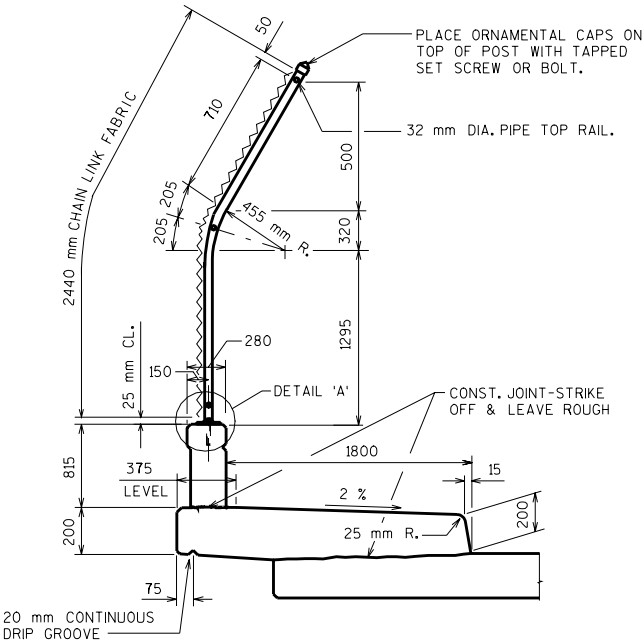
SHIMS REQUIRED ONLY WHEN POSTS ARE WELDED TO BASE PLATES. PROVIDE 4 SHIMS PER POST.

FENCE PART ELEVATION



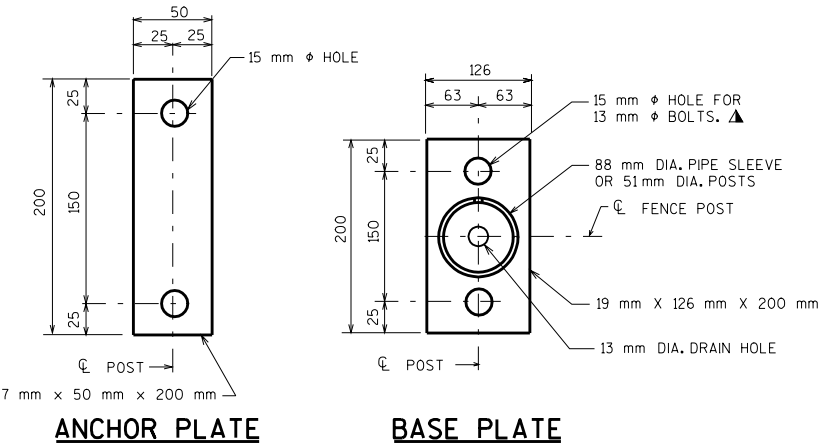
PLAN OF RAILING

NOTE: PLACE ALL NUTS ON OUTSIDE OF FENCE



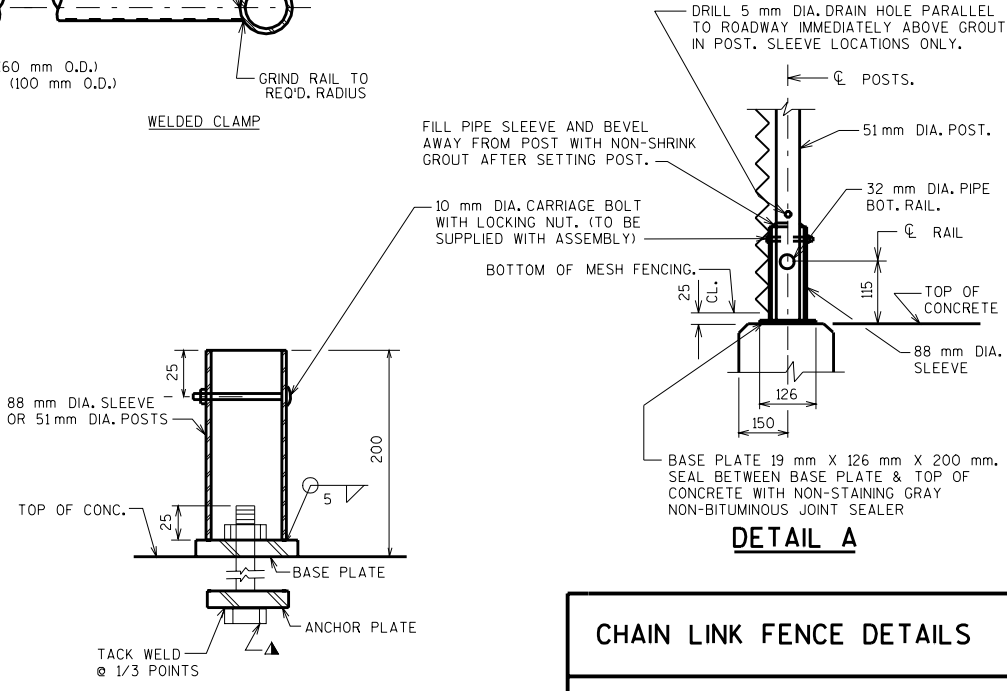
SECTION THRU FENCE

NOTE: FOR NON-SIDEWALK APPLICATIONS USE VERTICAL POSTS. (NO BEND)



ANCHOR PLATE

BASE PLATE



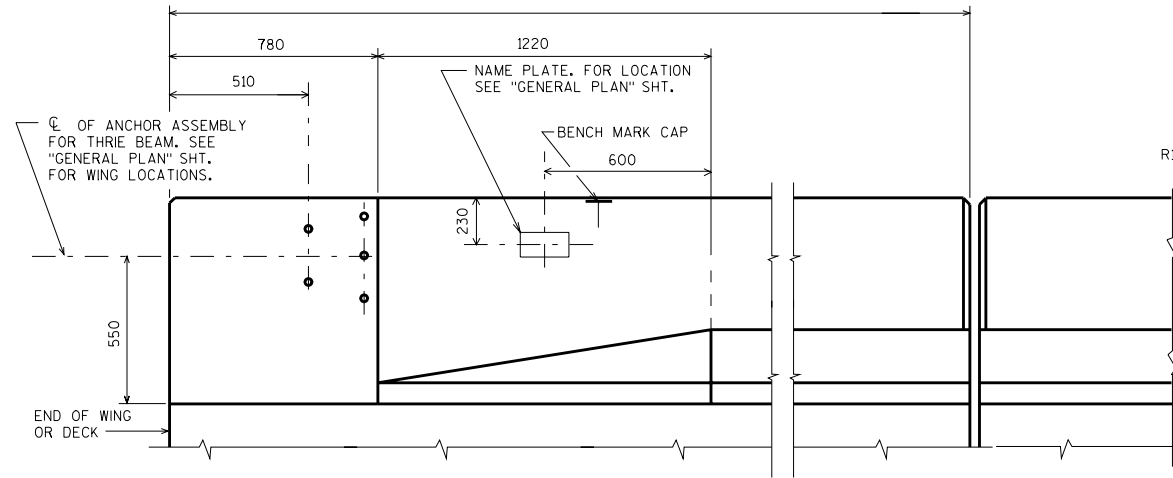
DETAIL A

CHAIN LINK FENCE DETAILS

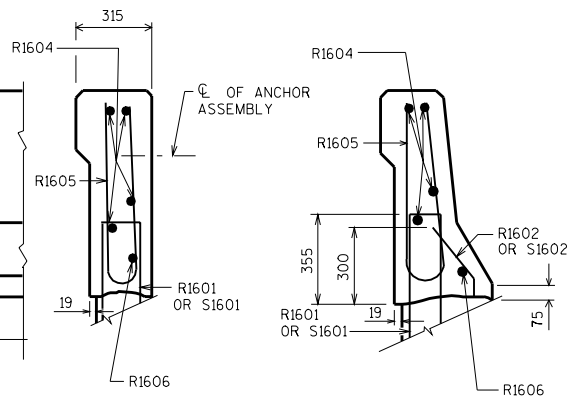
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

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1-03

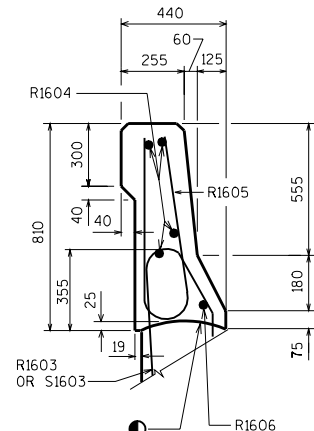


INSIDE ELEVATION



SECTION A

SECTION B

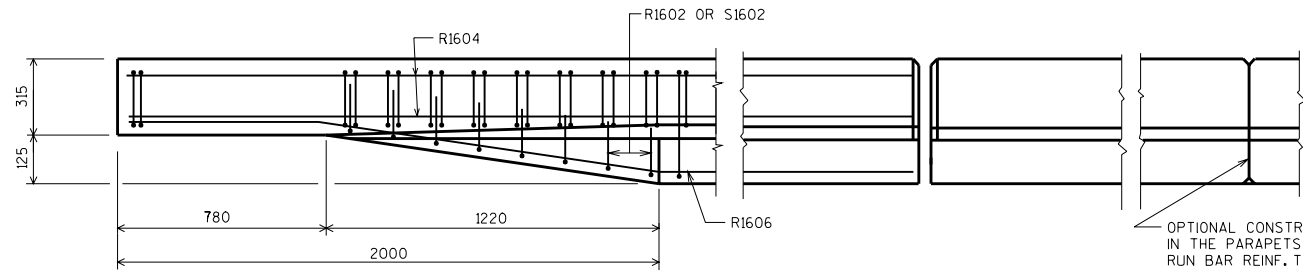


SECTION C

BILL OF BARS

FOR ABUTMENT PARAPETS

BAR MARK	COAT	ABUT.	ABUT.	LENGTH	BENT	LOCATION
R1601	X			1400	X	PARAPET VERT.
R1602	X			700	X	PARAPET VERT.
R1603	X			1370	X	PARAPET VERT.
R1604	X					PARAPET HORIZ.
R1605	X			1470	X	PARAPET VERT.
R1606	X				X	PARAPET HORIZ.
S1601	X			1350	X	PARAPET VERT.
S1602	X			700	X	PARAPET VERT.
S1603	X			1270	X	PARAPET VERT.

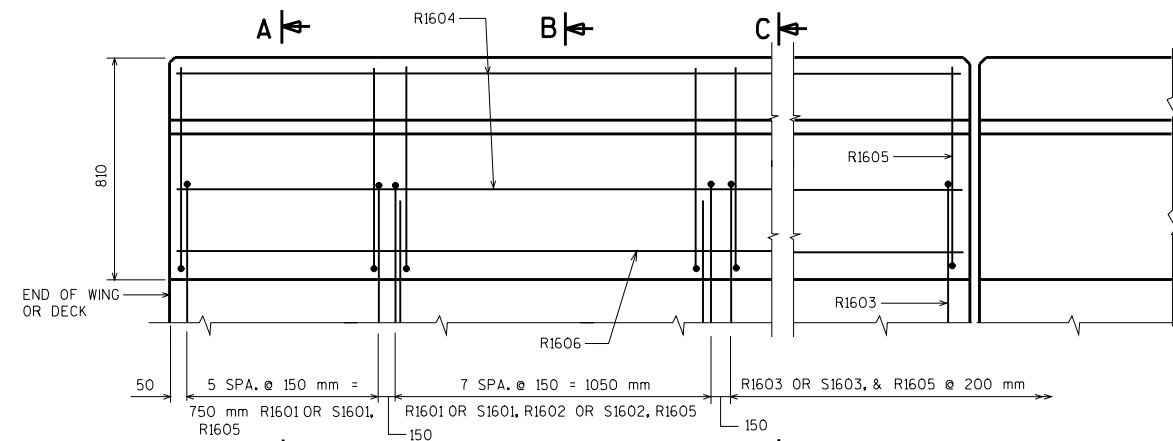


PLAN

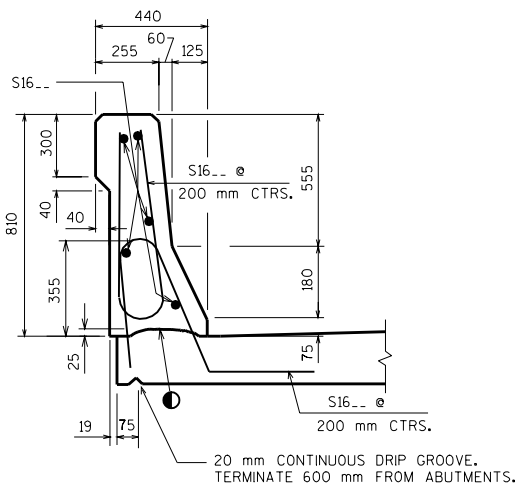
EXPANSION JOINT @ ABUT.
0° SKEW SHOWN, MATCH EXP.
JT. OPENING.

FOR TYPE A1 ABUT., USE 13 mm
FILLER TO TOP OF PARAPET.
SEE STD. 12.1.

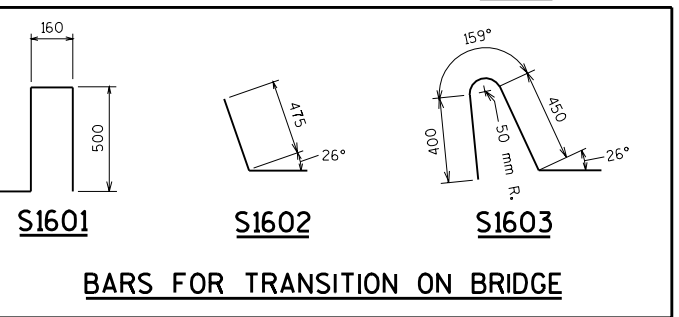
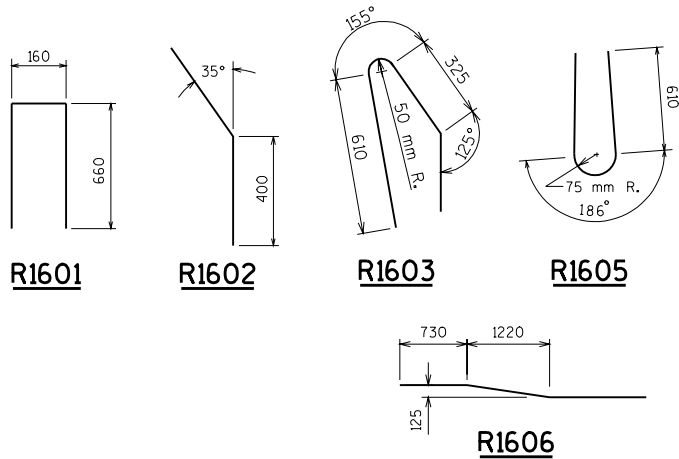
OPTIONAL CONSTRUCTION JOINTS
IN THE PARAPETS MAY BE USED.
RUN BAR REINF. THRU THE JOINT.
LAP LONGIT. BARS A MIN. OF 550 mm.
MIN. JOINT SPACING OF 25000 mm.
DEFINE CONST. JOINT WITH A 20 mm -
'V' GROOVE.



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE



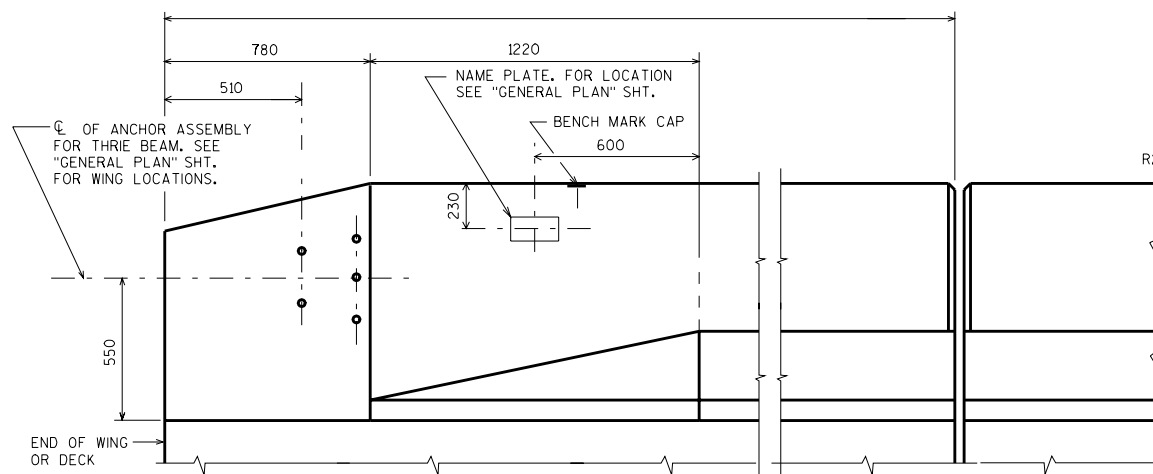
AREA = 0.24 m²
MASS = 577 kg/m
FORCE = 5.66 kN/m

ALL DIMENSIONS ARE IN MILLIMETERS.

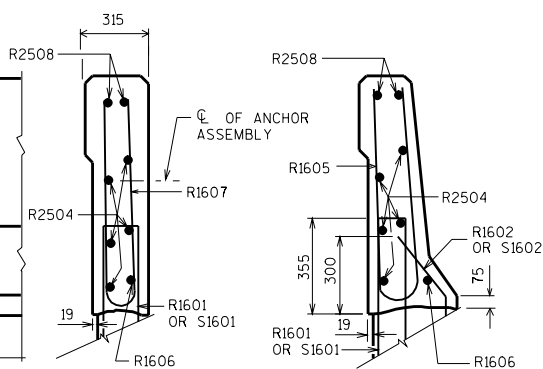
SLOPED FACE PARAPET 'LF'

STATE OF WISCONSIN
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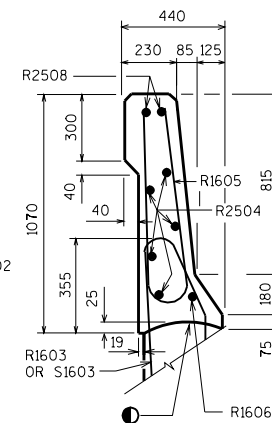


INSIDE ELEVATION



SECTION A

SECTION B



SECTION C

▲ LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

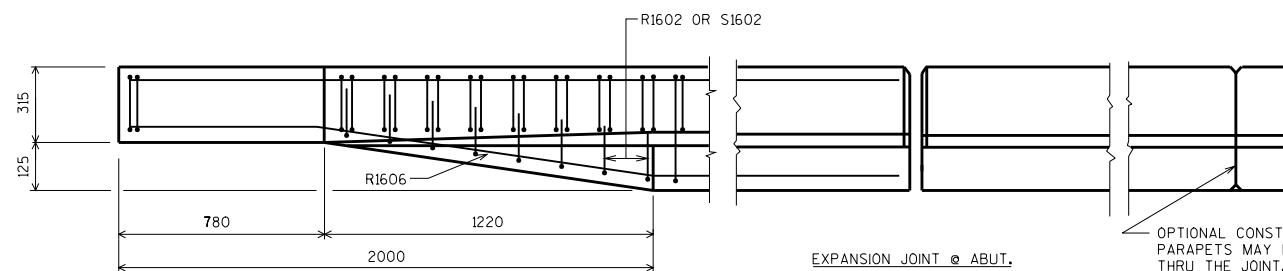
BILL OF BARS

FOR ABUTMENT PARAPETS

BAR MARK	COAT	ABUT.	ABUT.	LENGTH	BENT	BAR SERIES	LOCATION
R1601	X			1400	X		PARAPET VERT.
R1602	X			700	X		PARAPET VERT.
R1603	X			1370	X		PARAPET VERT.
R2504	X						PARAPET HORIZ.
R1605	X			1980	X		PARAPET VERT.
R1606	X				X		PARAPET HORIZ.
R1607	X			1720	X	▲	PARAPET VERT.
R2508	X				X		PARAPET HORIZ.
S1601	X			1350	X		PARAPET VERT.
S1602	X			700	X		PARAPET VERT.
S1603	X			1270	X		PARAPET VERT.

BAR SERIES TABLE

MARK	NO. REQD.	LENGTH
R1607	4 SERIES OF 6	1460 TO 1980

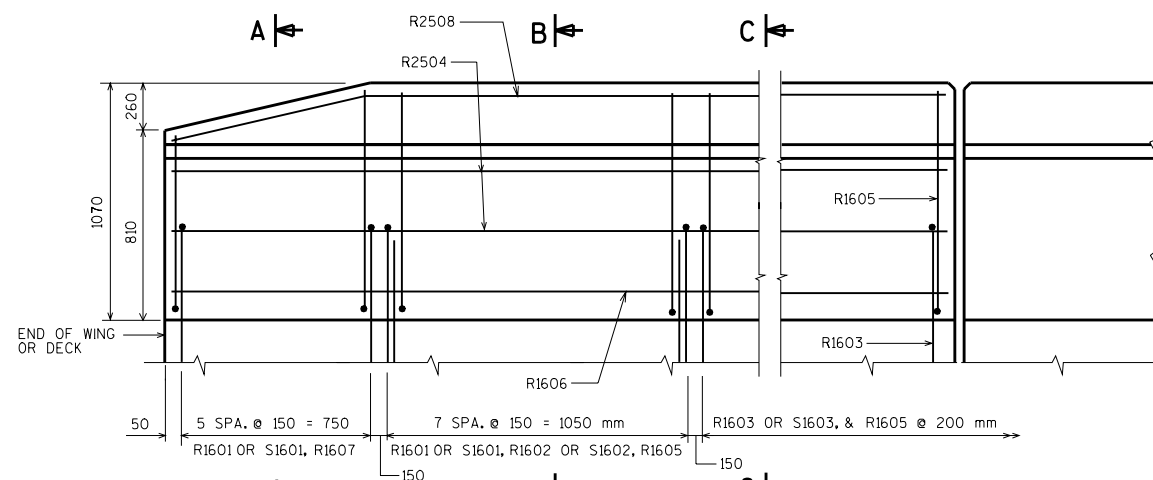
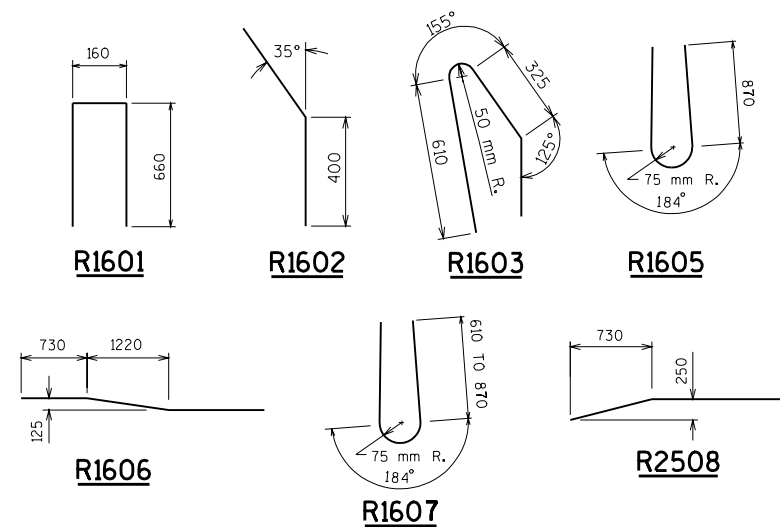


PLAN

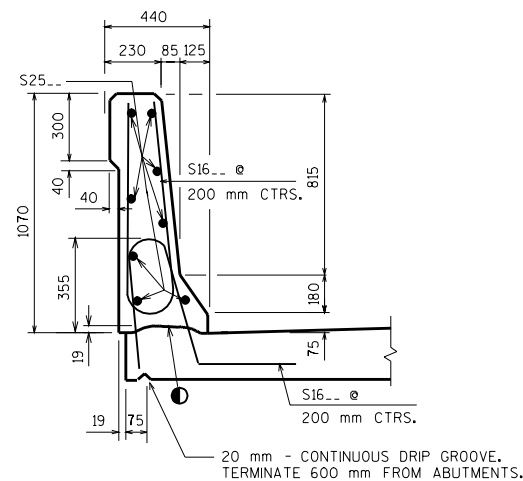
EXPANSION JOINT @ ABUT.
0° SKEW SHOWN. MATCH EXP. JT. OPENING.

FOR TYPE A1 ABUT., USE 13 mm FILLER TO TOP OF PARAPET. SEE STD. 12.1.

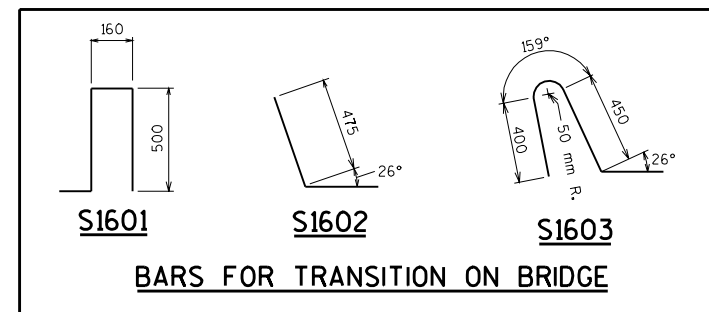
OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1050 mm. MIN. JOINT SPACING OF 25000 mm. DEFINE CONST. JOINT WITH A 20 mm - 'V' GROOVE.



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE



BARS FOR TRANSITION ON BRIDGE

AREA = 0.294 m²
MASS = 707 kg/m
FORCE = 6.94 kN/m

● CONST. JOINT - STRIKE OFF AS SHOWN.

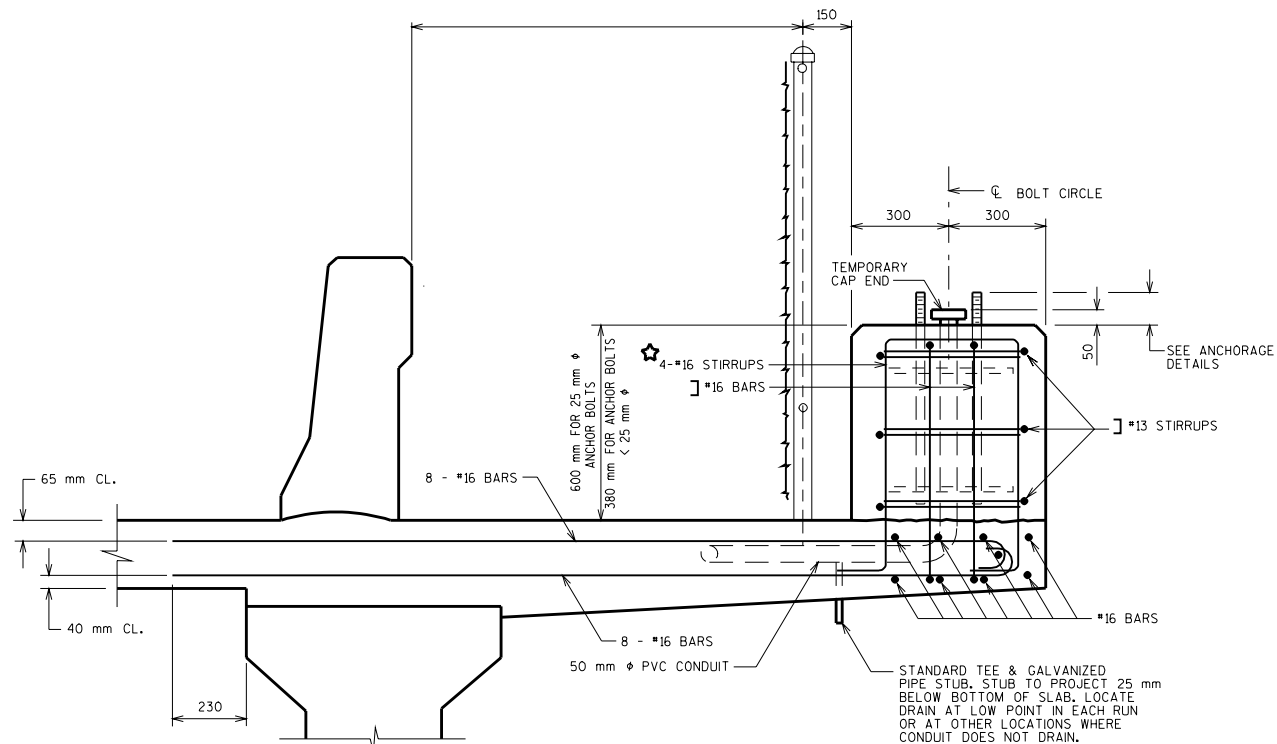
ALL DIMENSIONS ARE IN MILLIMETERS.

SLOPED FACE PARAPET 'HF'

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

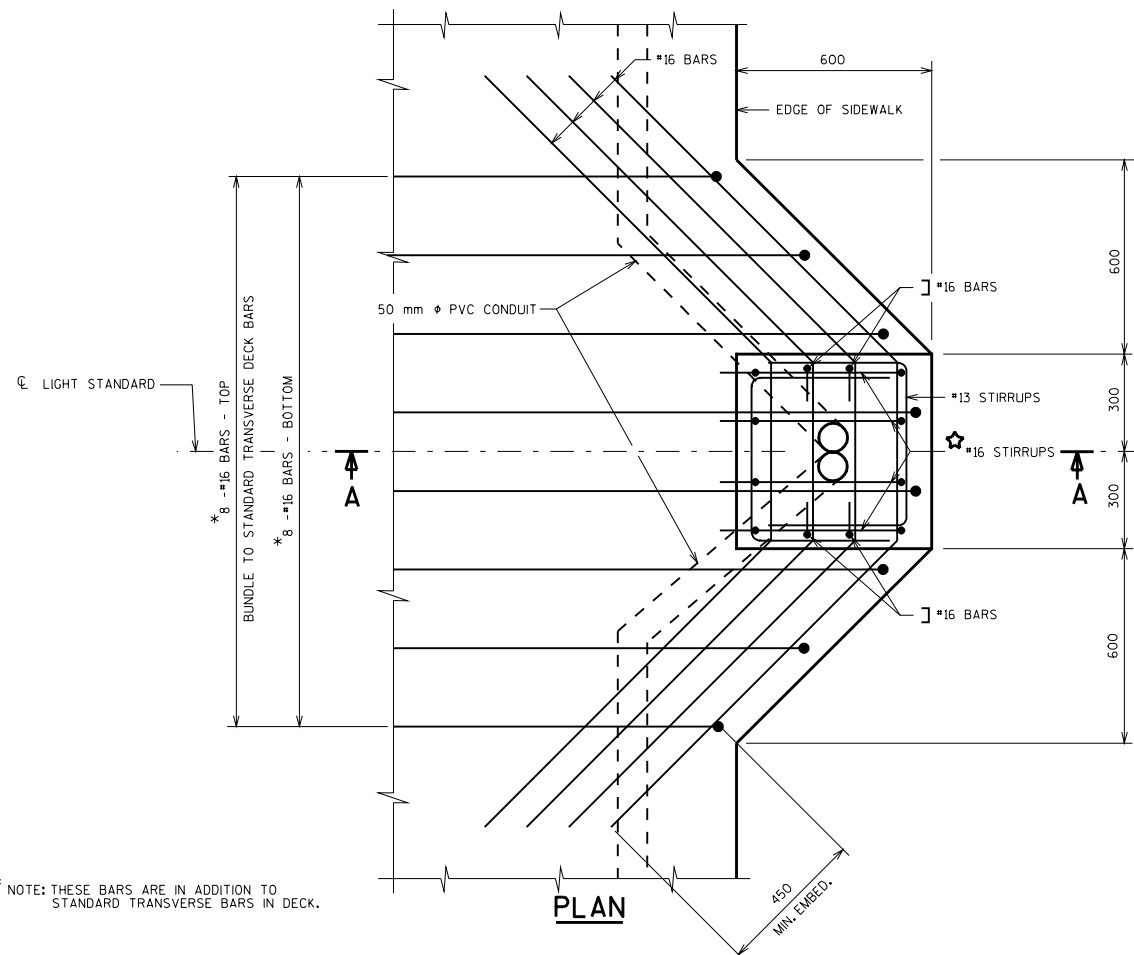
APPROVED: _____

DATE:
1/03



SECTION A

★ TIE IN PLACE AFTER ANCHOR BOLT ASSEMBLY LOCATED.



* NOTE: THESE BARS ARE IN ADDITION TO STANDARD TRANSVERSE BARS IN DECK.

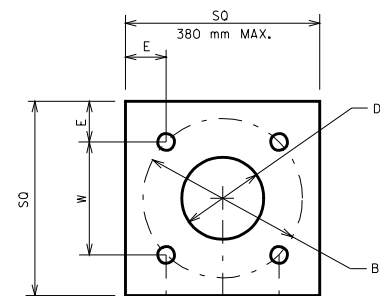
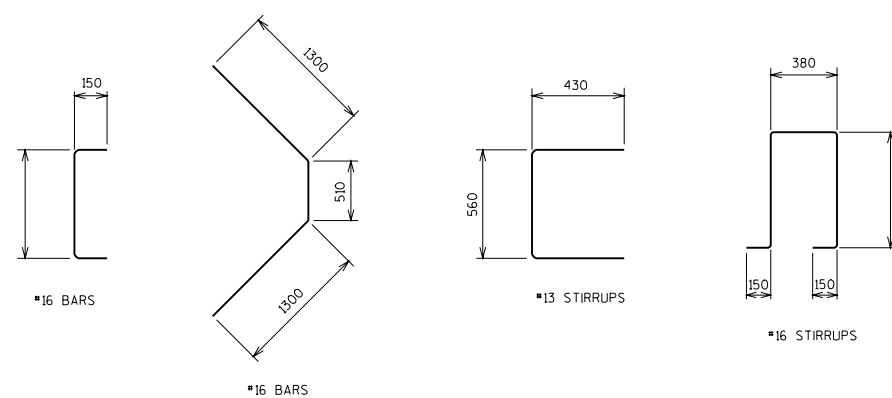
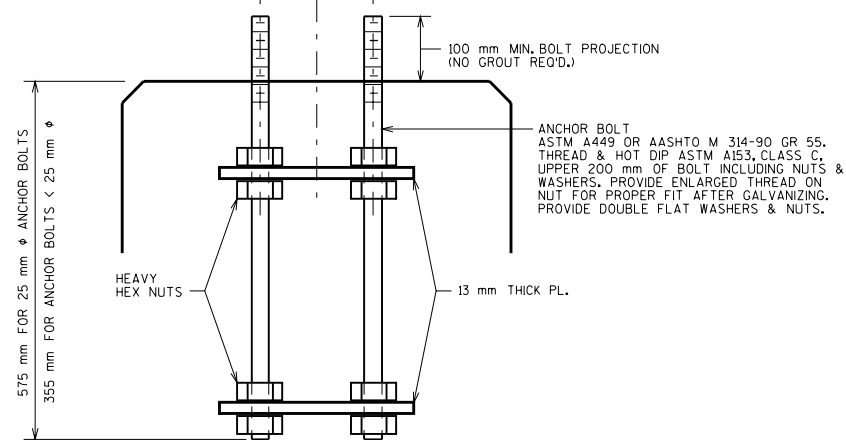


TABLE FOR "TYPE 5 LIGHT POLE"
FROM FACILITIES DEV. MANUAL
WITH 25 mm ϕ ANCHOR BOLTS.
(ANY OTHER LIGHT POLE TYPE
MUST BE DESIGNED FOR.)

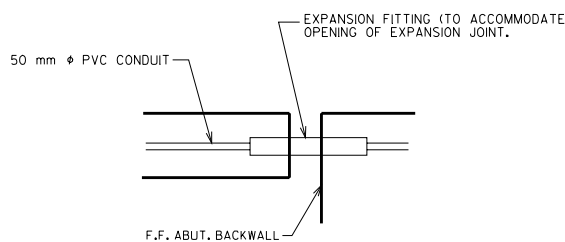
SQ	342 mm
E	68 mm
W	206 mm
BC	292 mm
D	242 mm

W = $0.707 \times BC$
 $SQ = BC + 2d$
 d = ANCHOR BOLT DIA.
 $E = (SQ - W)/2$
 $D_{MAX} = BC - 2d$
 $D_{MIN} = 2 \times \text{CONDUIT DIA.} + 25 \text{ mm}$



GENERAL NOTES

ALL BARS TO BE EPOXY COATED.
 THIS STANDARD IS DESIGNED TO ACCOMMODATE
 4 ANCHOR BOLTS OF A MAXIMUM DIAMETER OF 25 mm.
 ANCHORAGE TO BE PAID FOR AS "ANCHOR ASSEMBLY
 LIGHT POLES" EA.
 ALL DIMENSIONS ARE IN MILLIMETERS.

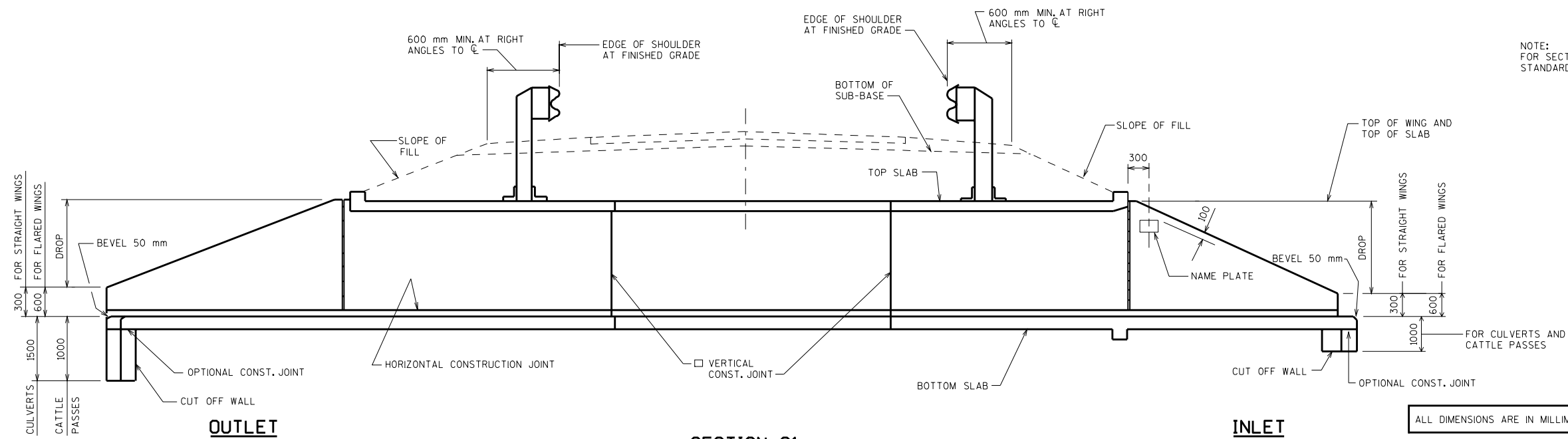
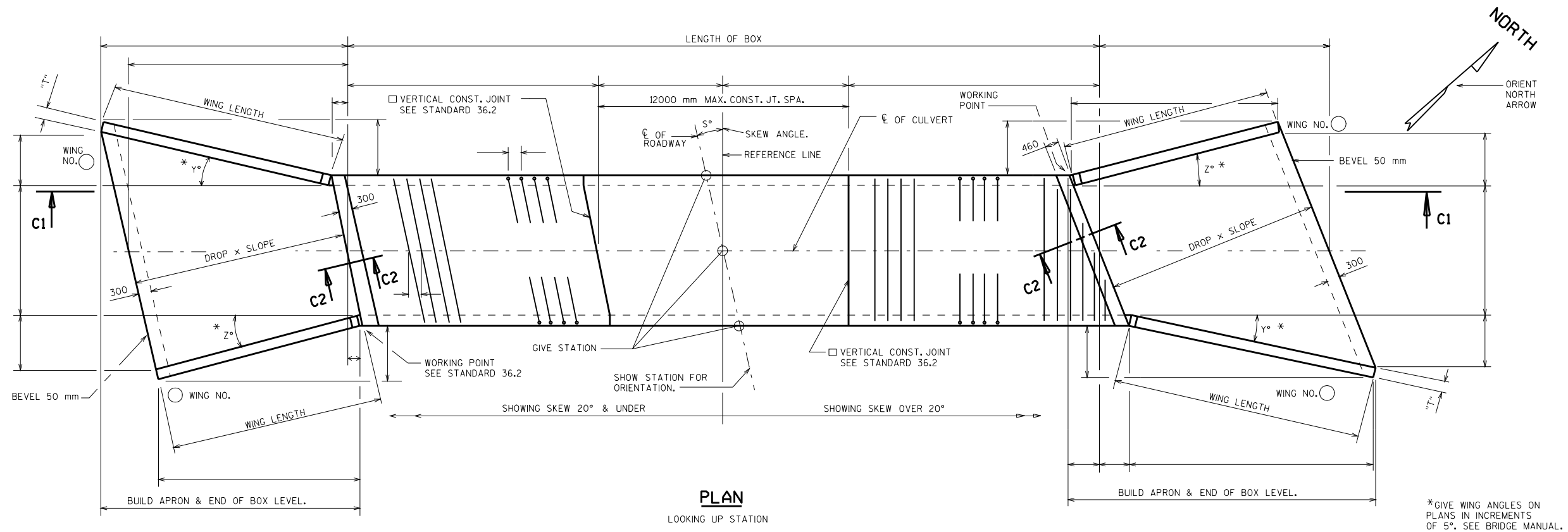


TO BE INCIDENTAL TO BID ITEM, "NON-METALLIC
 CONDUIT, SCHEDULE 40, 50 mm".

LIGHTING DETAIL

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1-02



DESIGN DATA

LIVE LOAD: MS 18
 **EARTH LOAD: DESIGNED FOR MILLIMETERS OF FILL
 ALLOWABLE DESIGN STRESSES:
 CONCRETE MASONRY GRADE A-FA — $f'c = 24 \text{ MPa}$
 BAR STEEL REINFORCEMENT — $f_y = 420 \text{ MPa}$

**FIGURE TO BE TO THE NEAREST 100 mm
 ON FILLS UNDER 1000 mm AND TO THE
 NEAREST 300 mm ON FILLS OVER 1000 mm

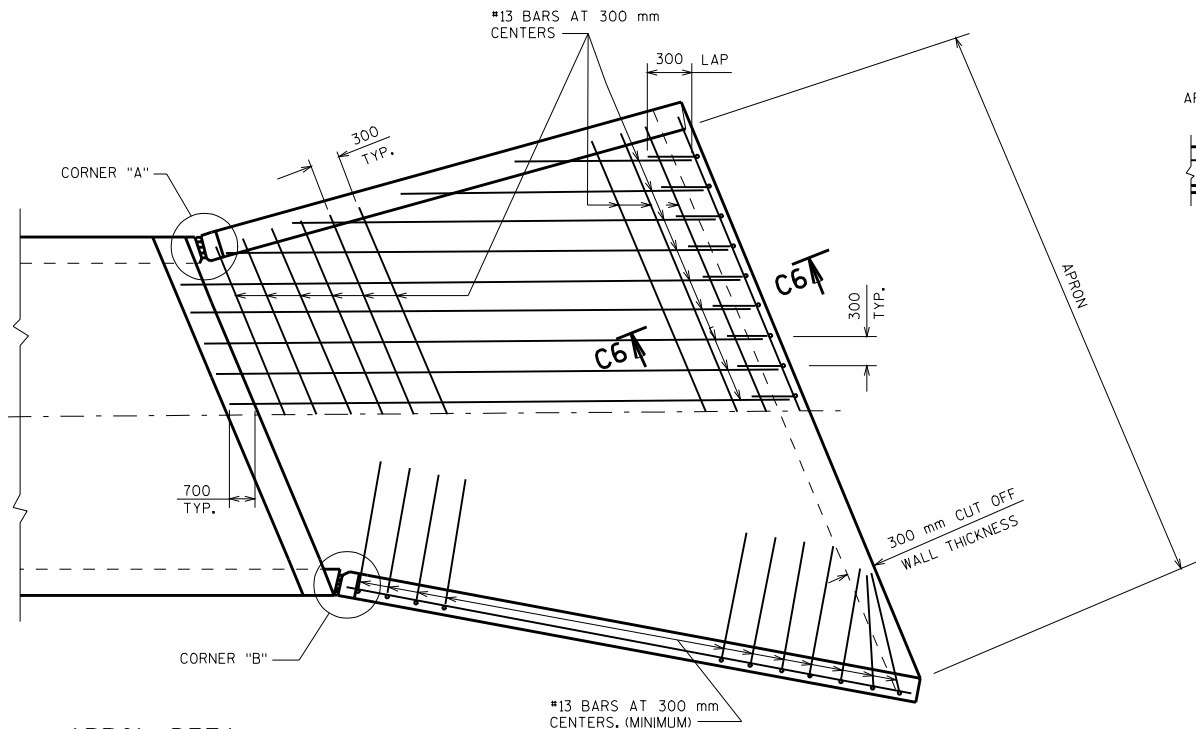
ALL DIMENSIONS ARE IN MILLIMETERS.

BOX CULVERT LAYOUT

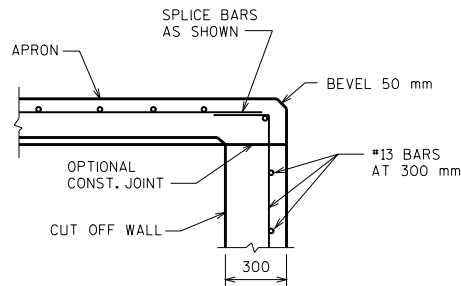
STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

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1-02



APRON DETAIL



SECTION C6

"H" (mm)	"L" (mm)
≤ 1525	690
> 1525 - 2135	995
> 2135 - 2440	1220
> 2440 - 2745	1450
> 2745 - 3050	1755
> 3050 - 3355	1985
> 3355 - 3660	2290
> 3660 - 3960	2440
> 3960 - 4265	2590

"H" IS MAX. WING WALL HEIGHT

▲ IN LIEU OF CONSTRUCTION JOINTS IN THE BOTTOM SLAB, THE CONTRACTOR MAY PROVIDE 2" DEEP SAW CUTS WITHIN 12 HOURS AFTER POURING.

NOTES

BAR STEEL REINFORCEMENT SHALL BE IMBEDDED 50 mm CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES" SHALL BE THE EXISTING GROUND LINE.

WHEN STRUCTURE BACKFILL IS REQUIRED: ALL SPACES EXCAVATED AND NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH STRUCTURE BACKFILL TO THE ELEVATION AND SECTION EXISTING PRIOR TO EXCAVATION WITHIN THE LENGTH OF THE BOX.

THE CONCRETE IN THE CUT OFF WALL MAY BE PLACED UNDERWATER IF THE EXCAVATION CANNOT BE DEWATERED.

THE ALTERNATE CUT OFF WALL MAY BE USED IN LIEU OF THE CAST-IN-PLACE CONCRETE CUT OFF WALLS. PAYMENT SHALL BE BASED ON CONCRETE CUT OFF WALLS.

LOCATE NAME PLATE ON NEAREST RIGHT WING TRAVELING UP STATION, FACE NAME PLATE UP STATION.

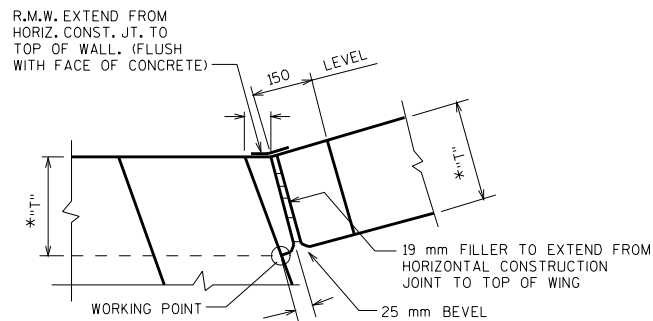
HARDWARE FOR POST ANCHORS SHALL BE PAID FOR AS "STRUCTURAL CARBON STEEL".

FOR "B" DESIGNATED CONCRETE BOX CULVERTS HAVING THEIR TOP SURFACE AT GRADE, HAND HELD FINISHING MACHINES MAY BE USED. NOTE THIS ON PLANS WHEN APPLICABLE.

THE CONTRACTOR MAY FURNISH A PRECAST CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE BOX CULVERT WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION. THE PRECAST CONCRETE BOX CULVERT SHALL CONFORM TO PRECAST DETAILS IN CHAPTER 36 STANDARDS OF THE CURRENT WISCONSIN DOT BRIDGE MANUAL. PAYMENT FOR THE PRECAST CULVERT SHALL BE BASED ON THE PRICES BID FOR THE ITEMS LISTED IN THE "TOTAL ESTIMATED QUANTITIES"

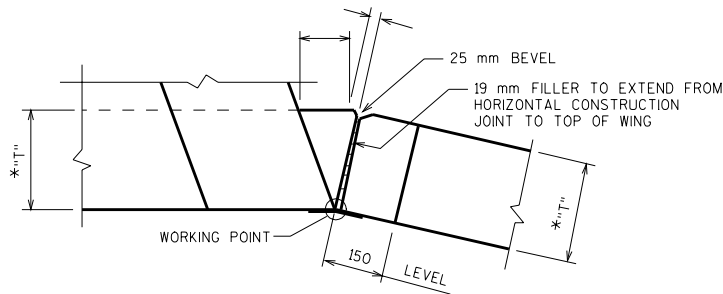
ALL DIMENSIONS ARE IN MILLIMETERS.

MAX. VALUE FOR "W_H" = 3960

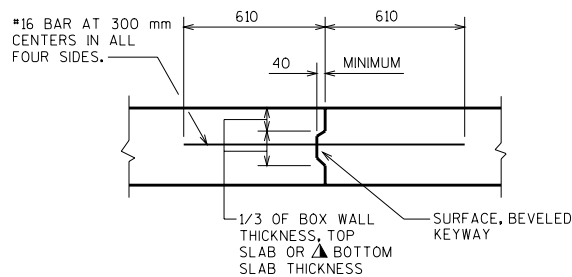


CORNER "A"

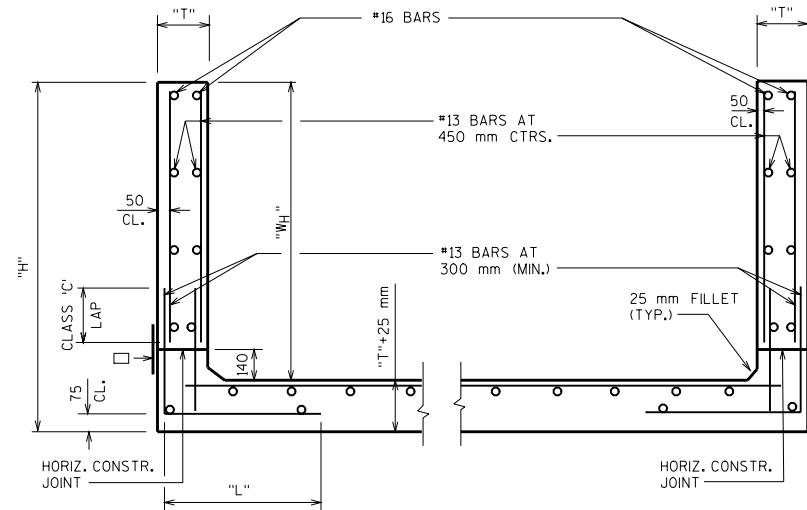
* DIMENSION "T" TO BE DETERMINED FROM BARREL DESIGN



CORNER "B"

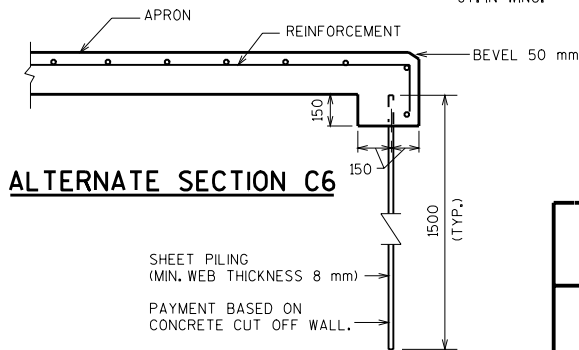


VERTICAL CONSTRUCTION JOINT



SECTION THRU WINGWALLS

□ 450 mm MIN. WIDTH RUBBERIZED MEMBRANE WATERPROOFING ALONG HORIZ. CONST. JT. IN WING.



ALTERNATE SECTION C6

ALTERNATE CUTOFF WALL

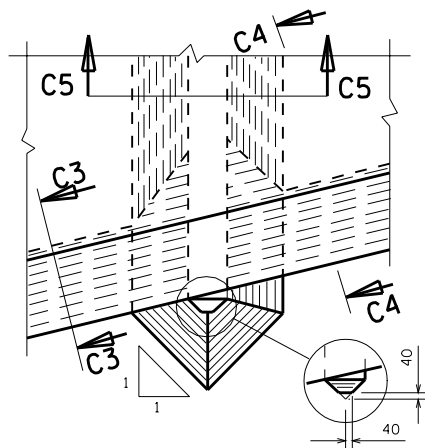
**BOX CULVERT
APRON DETAILS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

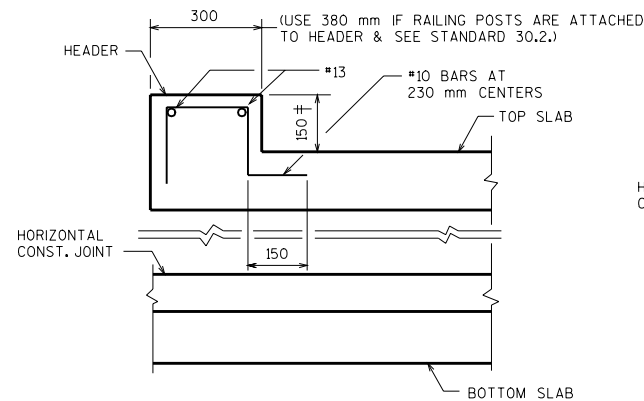
APPROVED: _____

DATE:

6-02

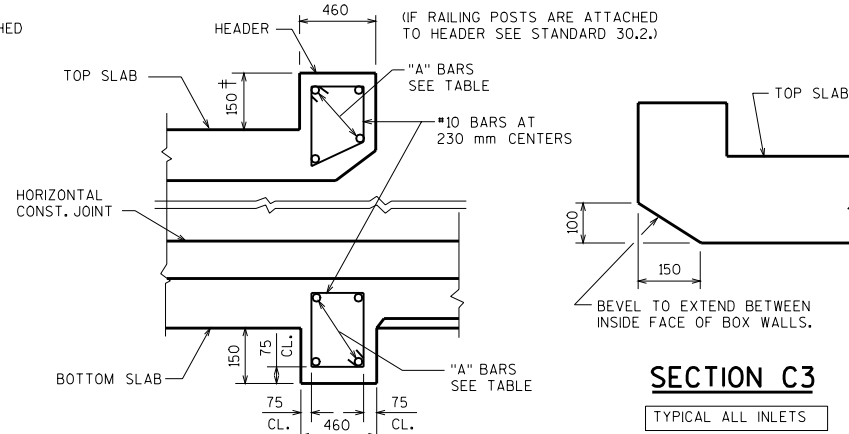


PLAN



SECTION C2 FOR SKEW OF 20° AND UNDER

OUTLET HEADERS SHOWN



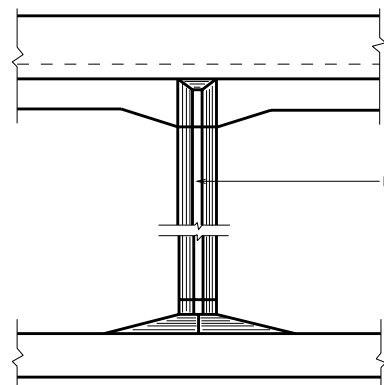
SECTION C3

TYPICAL ALL INLETS

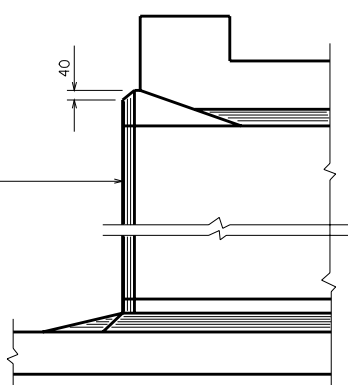
* HEADER LENGTH	"A" BARS
TO 3000 mm	4 - #22
OVER 3000 mm - 4000 mm	4 - #25
OVER 4000 mm - 4900 mm	4 - #29
OVER 4900 mm - 6000 mm	4 - #32

* HEADER LENGTH EQUALS THE DISTANCE BETWEEN \bar{C} OF WALLS IN ONE CELL MEASURED ALONG THE SKEW.

ALL DIMENSIONS ARE IN MILLIMETERS.

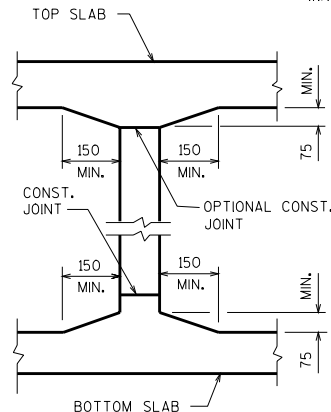


ELEVATION



SECTION C4

INLET NOSE CENTERWALL DETAILS

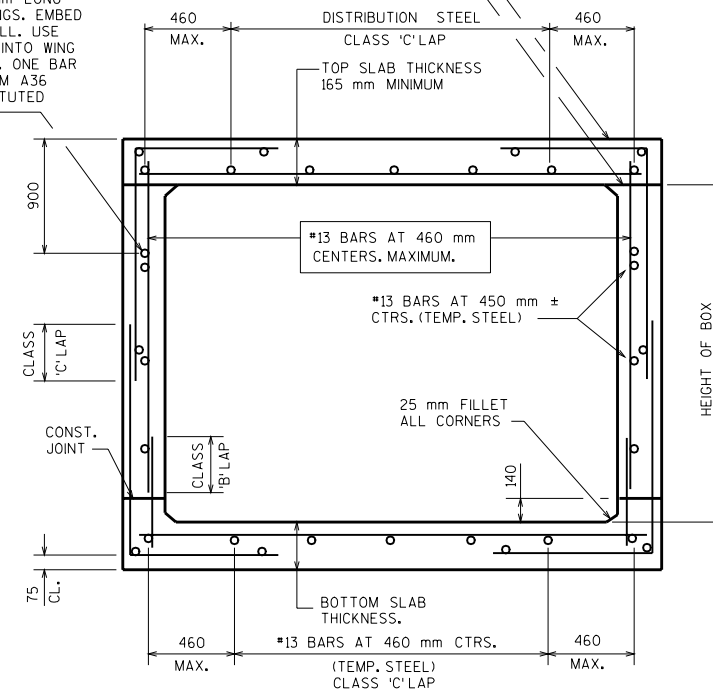


SECTION C5

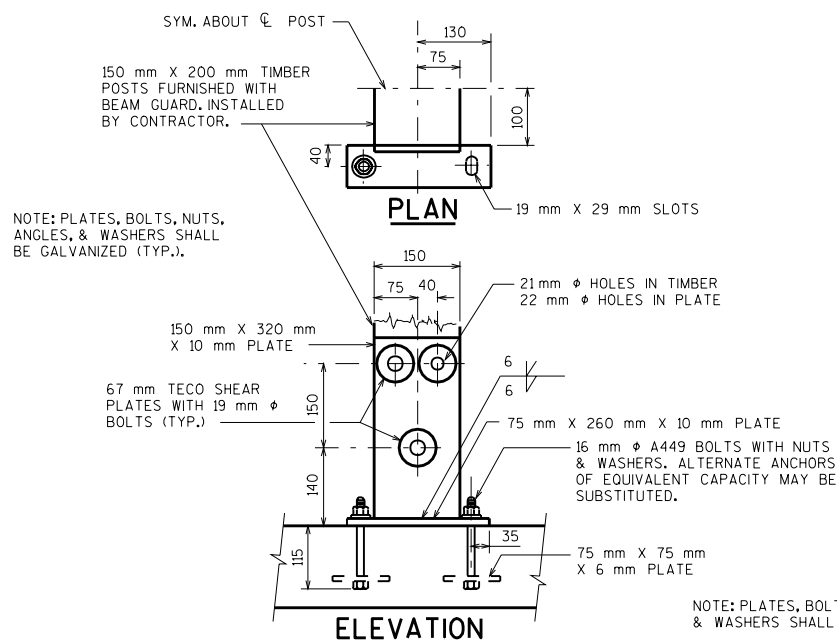
NOTE:
FOR MULTI-CELL CULVERTS IN THE TOP OF TOP SLAB, USE #13 BARS AT 300 mm IN THE LONGITUDINAL DIRECTION AND A MIN. OF #13 BARS AT 450 mm IN THE TRANSVERSE DIRECTION WHEN THE TOP SLAB IS AN INTEGRAL PART OF WEARING SURFACE.

FOR "HEIGHT OF BOX" > 1830 mm, PLACE 25 mm DIA. PLAIN (SMOOTH) ROUND DOWEL BAR, 760 mm LONG BETWEEN BARREL AND WINGS. EMBED 380 mm INTO BARREL WALL. USE DEBONDER ON EXTENSION INTO WING WALL. BEND AS REQUIRED. ONE BAR FOR EACH WINGWALL. ASTM A36 MATERIAL MAY BE SUBSTITUTED FOR AASHTO M31.

OPTIONAL CONSTRUCTION JOINT. OMIT 25 mm FILLET IF OPTIONAL CONST. JOINT IS USED.

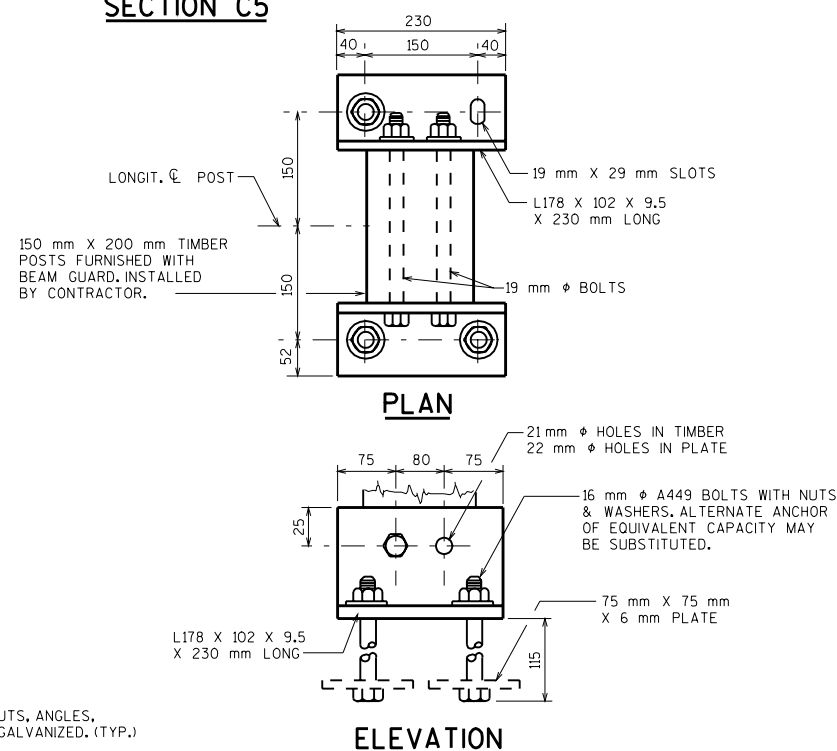


SECTION THRU BOX



TIMBER GUARD RAIL POST ANCHORS TYPE 1

USE FOR POSTS EMBEDDED 600 mm OR LESS.



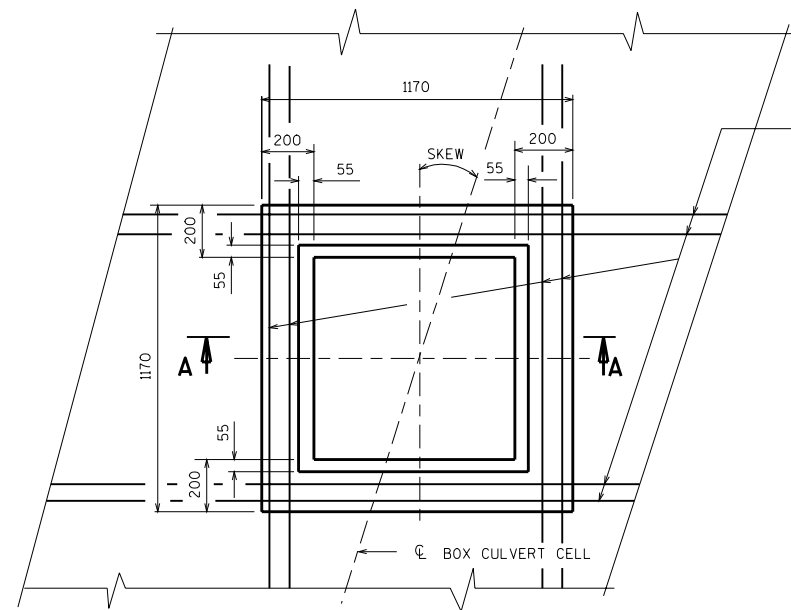
TIMBER GUARD RAIL POST ANCHORS, TYPE 2

USE FOR POSTS EMBEDDED OVER 600 mm BUT LESS THAN 1300 mm
ANCHORS NOT REQ'D FOR POSTS EMBEDDED 1300 mm OR MORE.

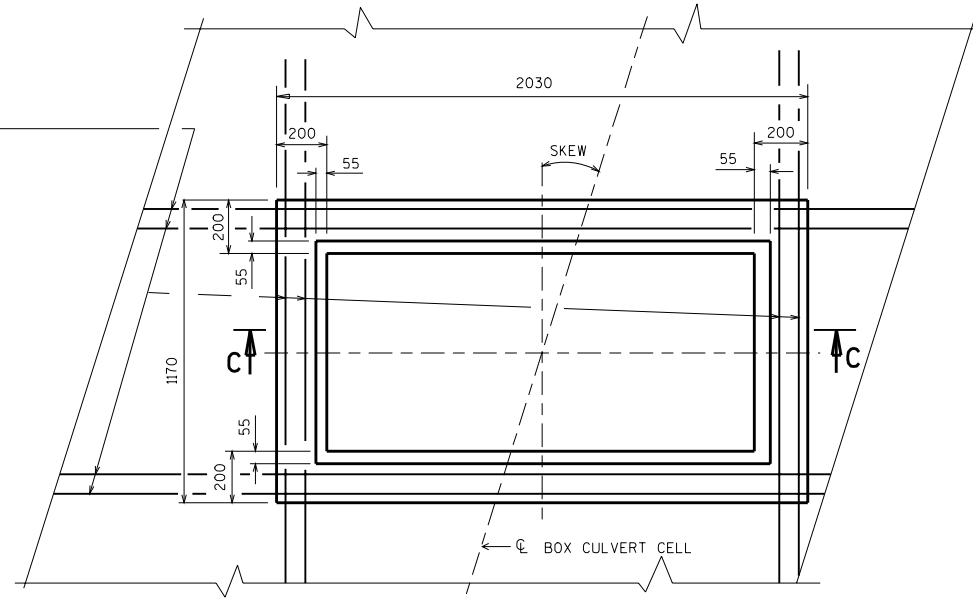
BOX CULVERT DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 7/00



INLET TYPE 8



INLET TYPE 9

MEDIAN INLET PLAN
(INLET COVER NOT SHOWN)

GENERAL NOTES

FIELD CUT BAR STEEL REINFORCEMENT IN TOP SLAB TO CLEAR THE OPENING PROVIDED FOR MEDIAN INLET.

ADJUSTMENT OF THE COVER TO GRADE MAY BE ACCOMPLISHED BY THE USE OF MORTAR AND BRICK. MAXIMUM ADJUSTMENT SHALL BE 200 mm.

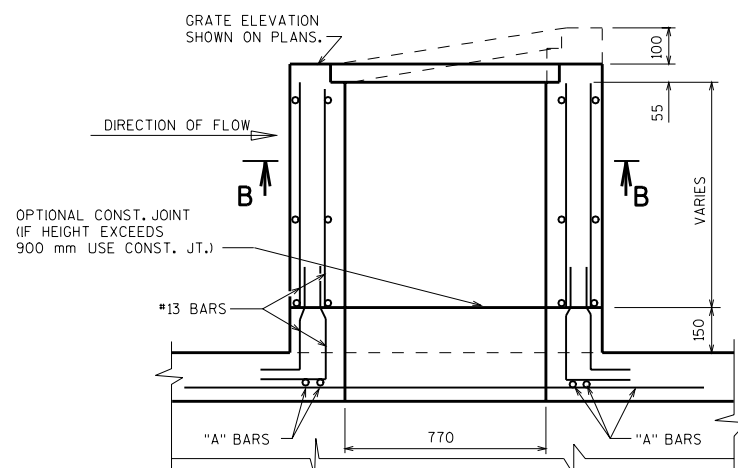
DESIGN NOTES

SIZE AND LENGTH OF "A" BARS TO BE DETERMINED BY THE DESIGNER.

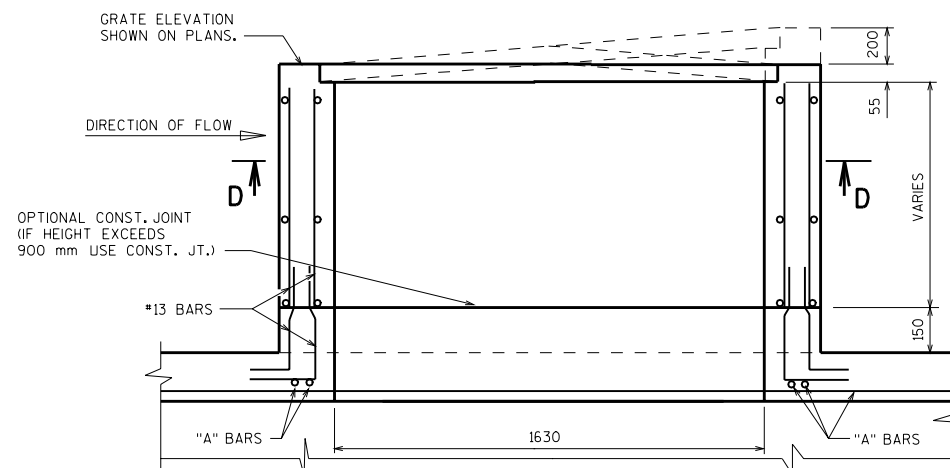
STEEL SHOWN IS ADEQUATE TO DEPTHS UP TO 4720 mm FOR INLET TYPE 9 AND 13410 mm FOR INLET TYPE 8, ASSUMING EQUIVALENT FLUID PRESSURE OF 1.58 kPa.

VERTICAL STEEL ADEQUATE FOR DEPTH UP TO 7620 mm ASSUMING WIND LOAD OF 2.40 kPa.

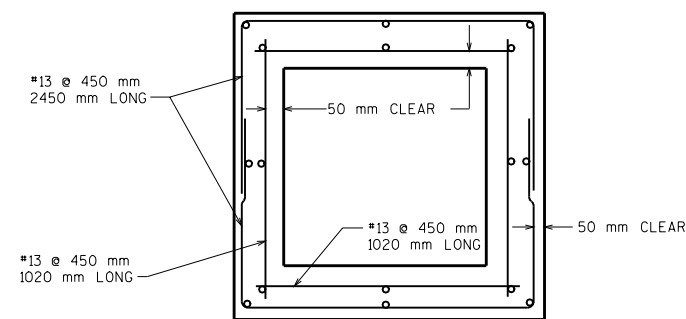
ALL DIMENSIONS ARE IN MILLIMETERS.



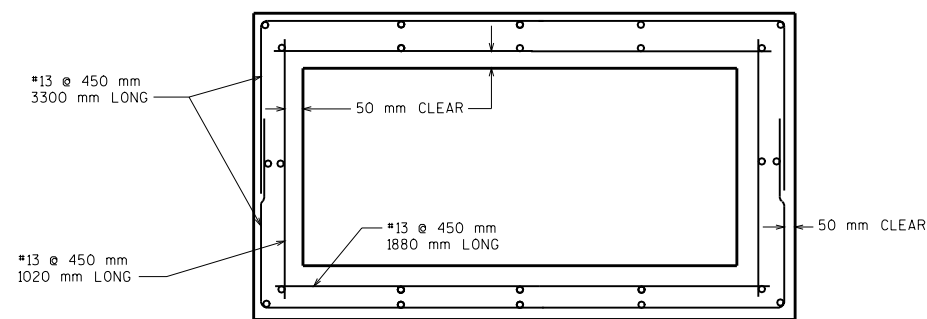
SECTION A-A



SECTION C-C



SECTION B-B

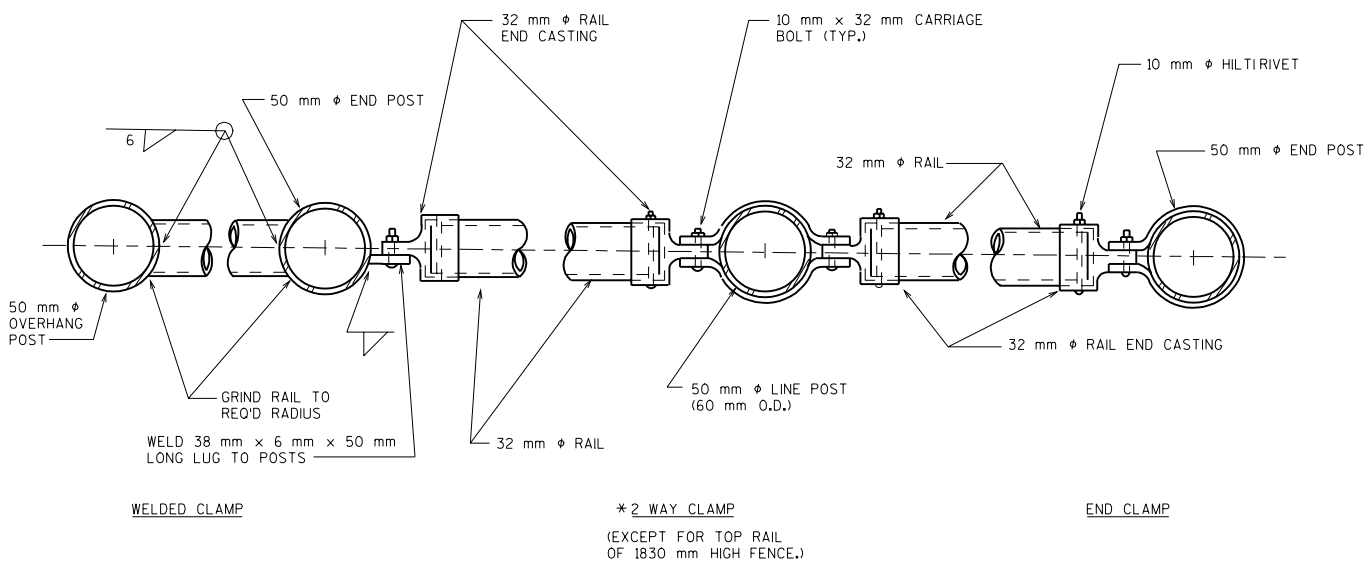
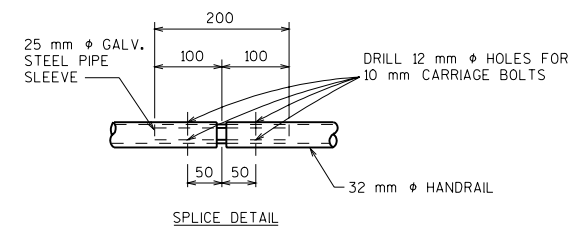
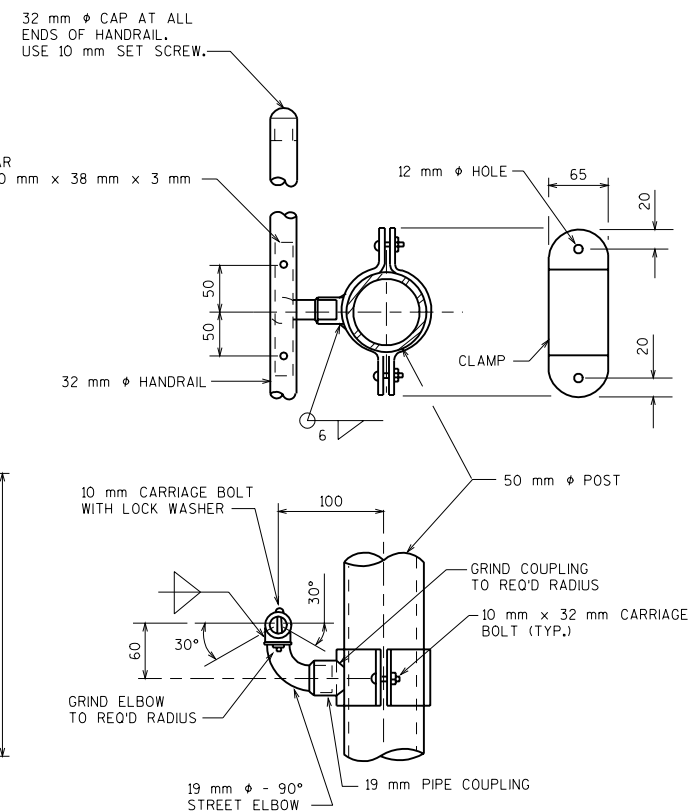
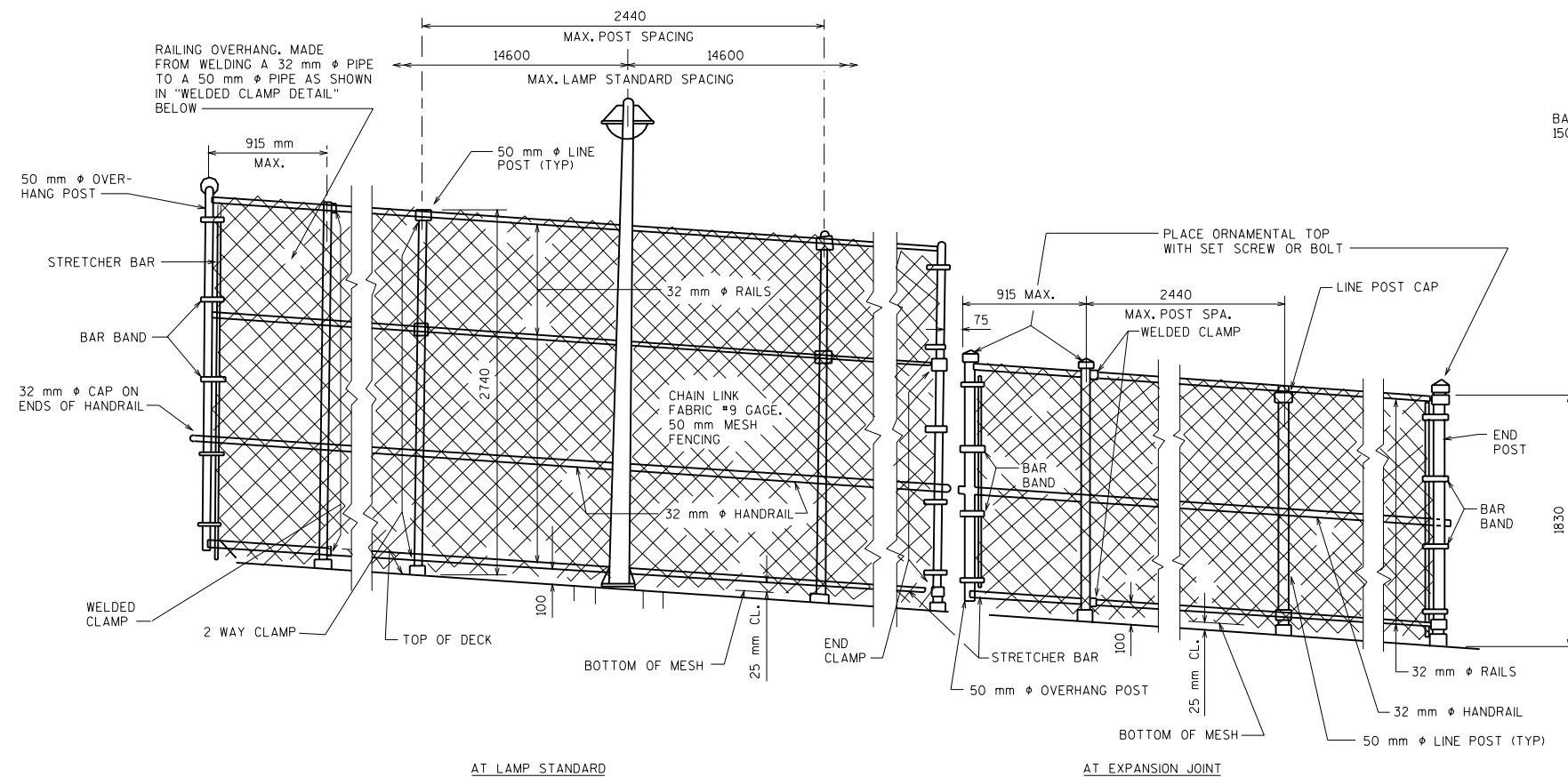


SECTION D-D

BOX CULVERT MANHOLE FOR INLET TYPE 8 & 9

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99



NOTE: PLACE ALL NUTS ON
OUTSIDE OF FENCE.

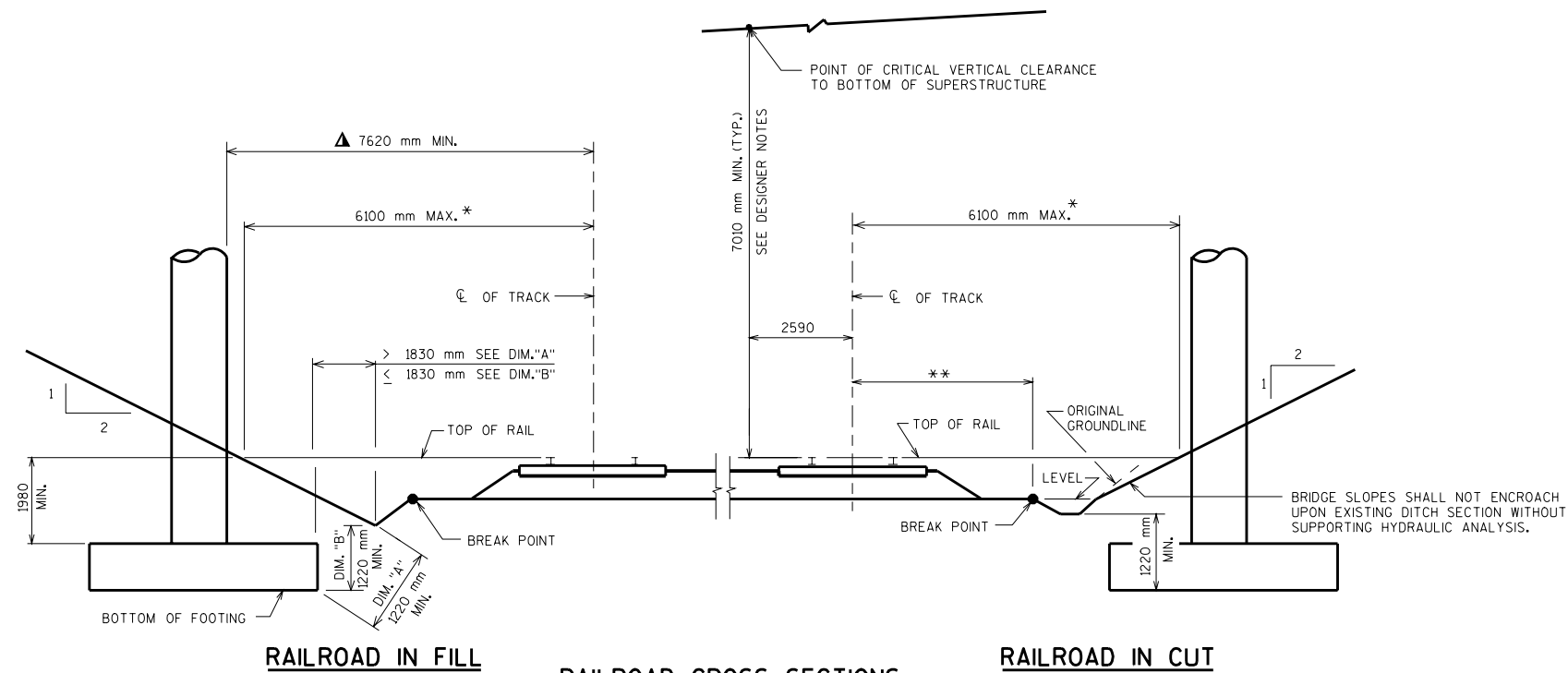
* ALTERNATE BOULEVARD 2-WAY CLAMP
MAY BE USED WHEN THE POST IS EITHER
BOLTED TO THE 88 mm ϕ PIPE SLEEVE OR
DIRECTLY WELDED TO THE BASE PLATE.

ALL DIMENSIONS ARE IN MILLIMETERS.

PEDESTRIAN OVERPASS DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____	DATE: 1/03
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DESIGNER NOTES

ALL DIMENSIONS ARE IN MILLIMETERS.

DIMENSIONS SHOWN APPLY TO CUT OR FILL SITUATIONS.

DECK DRAINS OR DOWN SPOUTS SHALL NOT DISCHARGE ONTO RAILROAD TRACK BED.

SLOPED FACE PARAPET LF SHALL BE USED. PEDESTRIAN RAILING WILL ONLY BE PROVIDED IF THERE IS A SIDEWALK. SEE CHAPTER 38 OF THE BRIDGE MANUAL.

VERTICAL CLEARANCE LESS THAN 7000 mm MAY BE PROVIDED IN SOME SITUATIONS WITH APPROVAL OF THE OFFICE OF THE COMMISSIONER OF RAILROADS. CONSULT WITH CENTRAL OFFICE RAILROAD UNIT. MAXIMUM ALLOWABLE HEIGHT 7100 mm BY FHWA.

** VARIABLE DISTANCE WHICH IS FOUND FROM FIELD SURVEY.

* SITE SPECIFIC JUSTIFICATION REQUIRED FOR GREATER DISTANCES. LATERAL CLEARANCES SHALL BE ESTABLISHED BASED ON SITE SPECIFIC CONDITIONS AND ECONOMICAL STRUCTURE DESIGN; CONSULT WITH CENTRAL OFFICE RAILROAD UNIT. SEE 23 CODE OF FEDERAL REGULATIONS PT 646, SUBPT. B APPENDIX.

▲ USING THIS MIN. CRITERIA ELIMINATES THE NEED FOR CRASH WALLS @ PIERS.

TEMPORARY CONSTRUCTION CLEARANCES ARE 6400 mm VERTICAL AND 3660 mm HORIZONTAL FROM CENTERLINE OF TRACK TO FALSEWORK.

ACCOMMODATION FOR ADDITIONAL TRACKS REQUIRES FHWA APPROVAL. CONFER WITH CENTRAL OFFICE RAILROAD UNIT.

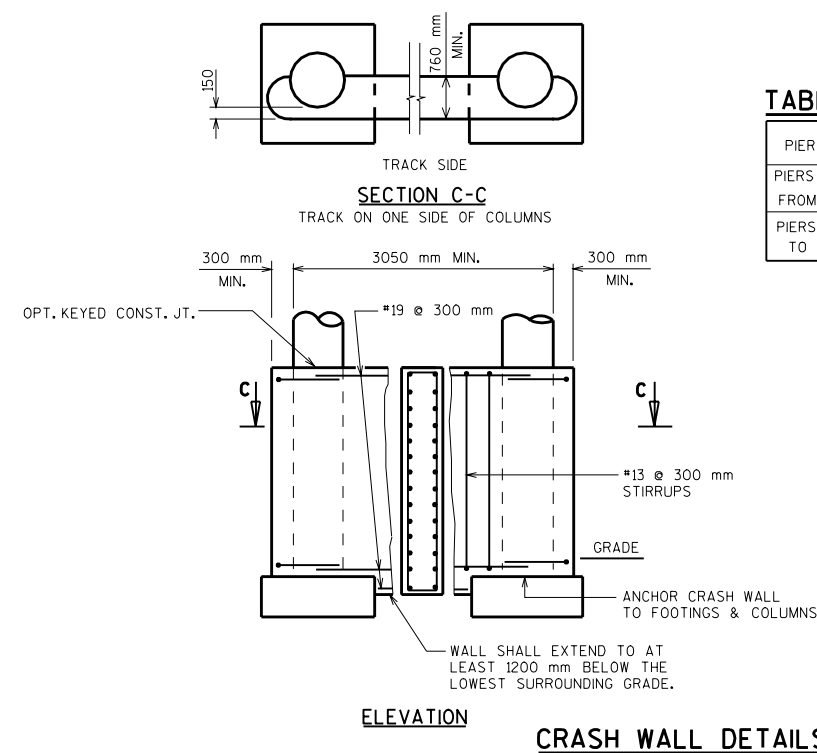
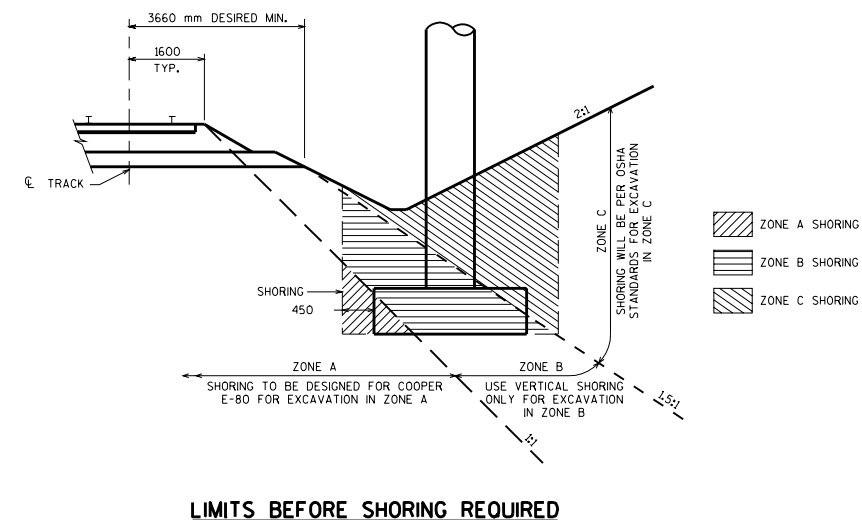
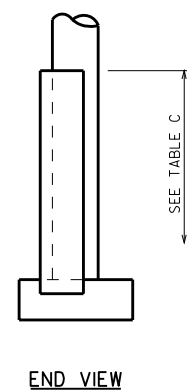


TABLE C

PIER LOCATION	HEIGHT OF CRASH WALL ABOVE TOP OF RAIL
PIERS ≤ 3650 mm FROM CL TRACK	3650
PIERS 3650 mm TO 7620 mm	1830

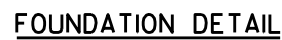
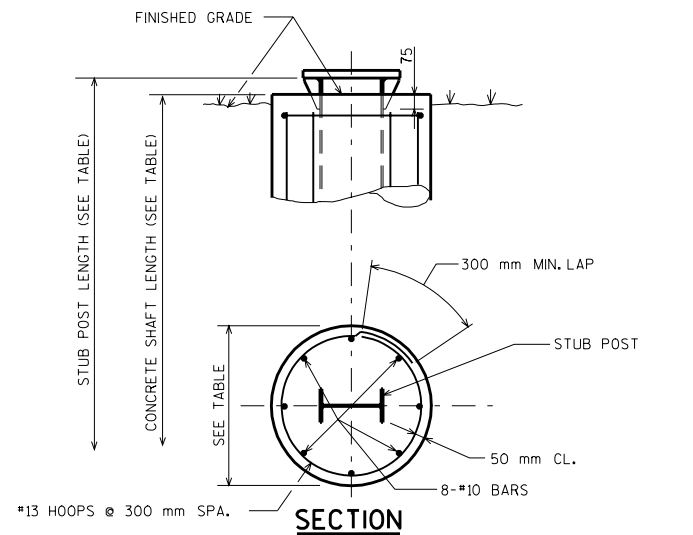


HIGHWAY OVER RAILROAD DESIGN REQUIREMENTS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
7/01



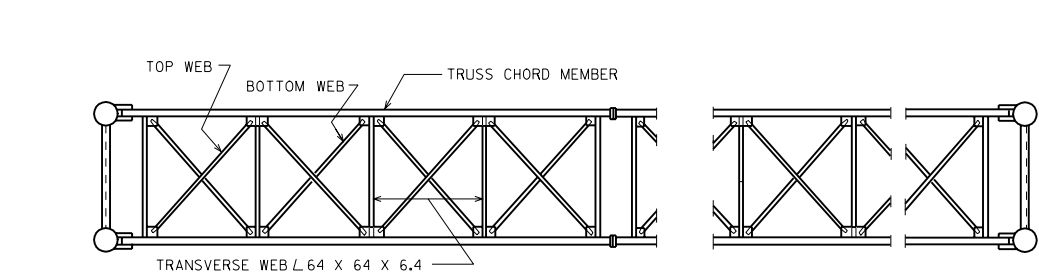
POST SLOT ORIENTATION

	TYPE	#10-VERTICAL	#13-HOOPS
REIN.	A	8 @ 1350 mm	5 @ 1900 mm
	B	8 @ 1950 mm	7 @ 1900 mm
	C	8 @ 2100 mm	7 @ 1900 mm
	D	8 @ 2250 mm	8 @ 1900 mm
	E	8 @ 2400 mm	9 @ 1900 mm

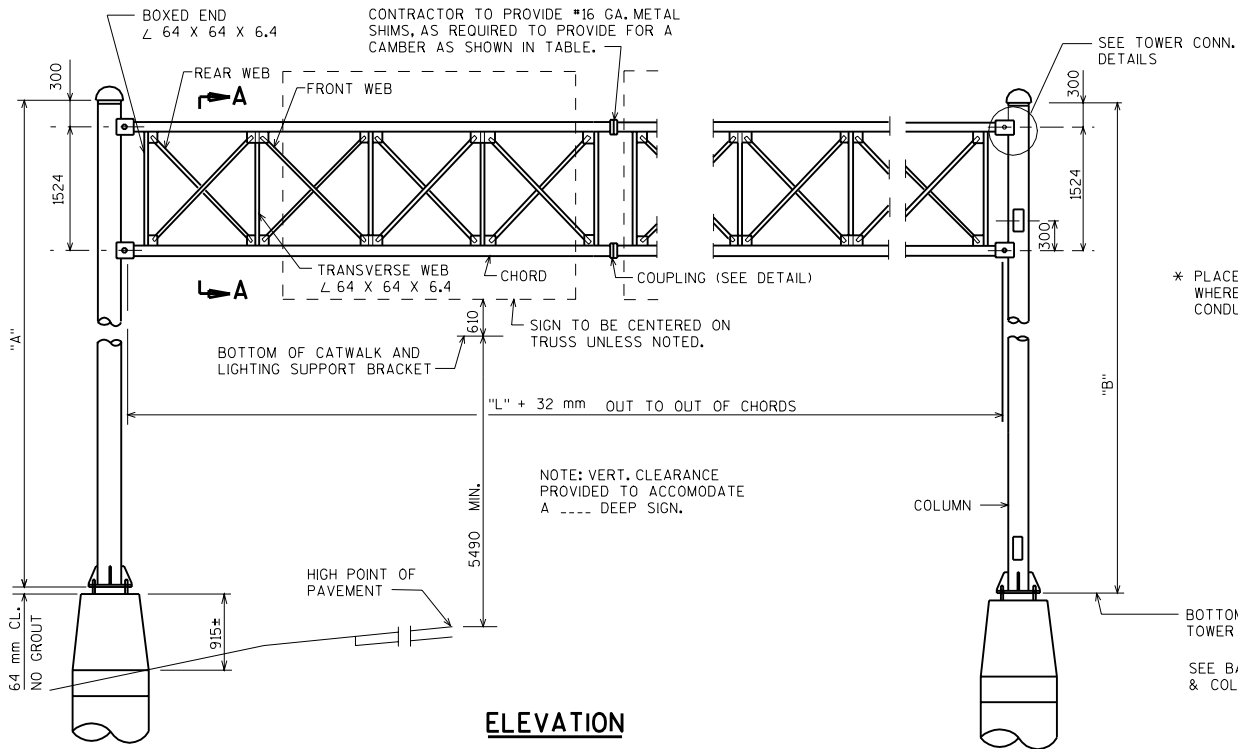
STRUCTURAL CARBON STEEL PAY WTS. (1POST) = K + (POST LENGTH X POST WT.)
 "K" INCLUDES STUB, BASE PLATES, STIFFS., BOLTS, AND WASHERS.

NOTE:
TIGHTEN THE HIGH STRENGTH BOLTS TO THE TORQUE SHOWN.
DO NOT OVER TIGHTEN.

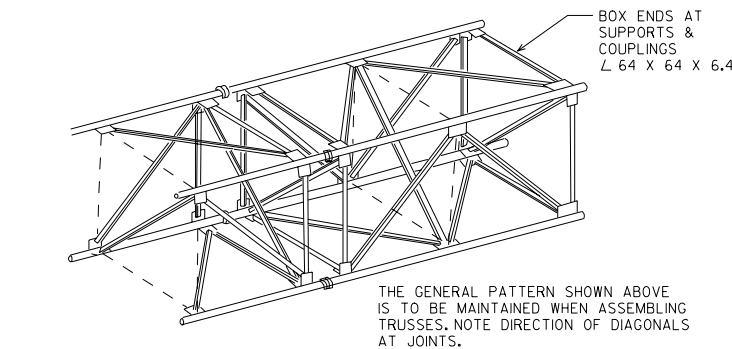
METRIC STANDARD 39.1



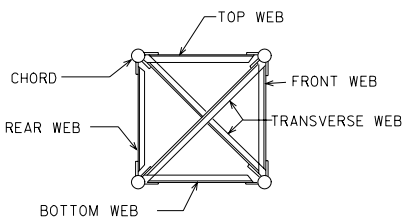
PLAN



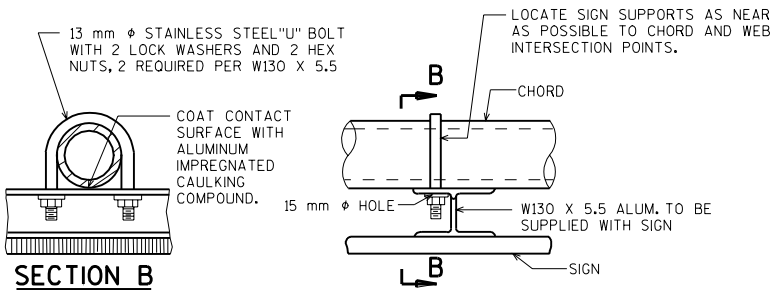
ELEVATION



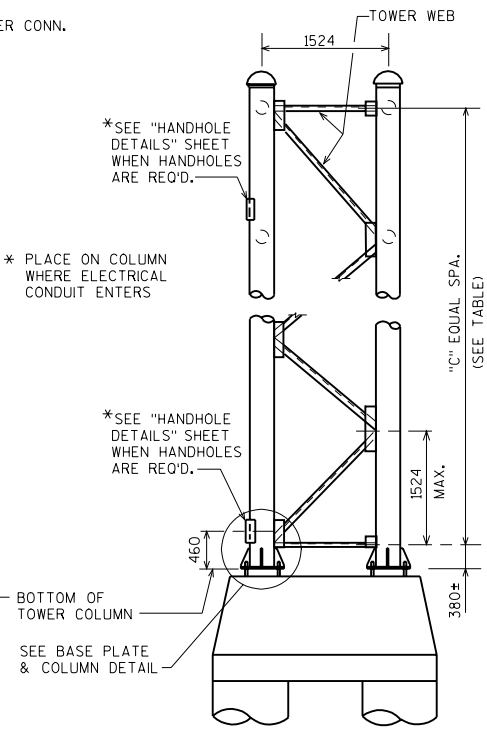
TYPICAL TRUSS SECTION



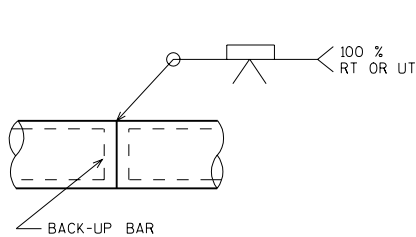
SECTION A



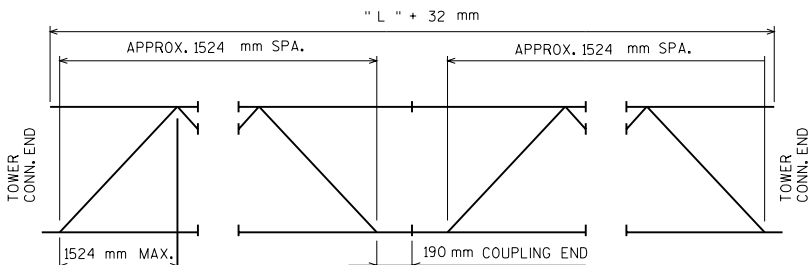
TYPICAL SIGN CONNECTION



END VIEW



CHORD SPLICE



TRUSS ARRANGEMENT

FABRICATOR MAY MAKE TRUSSES ANY LENGTH KEEPING A SECTION A MINIMUM OF 6096 mm & A MULTIPLE OF 1524 mm. CHORD FIELD SPLICES SHALL BE MADE WITH COUPLINGS. CHORD SHOP SPLICE SHALL BE THE WELDED SPLICE SHOWN ABOVE.

NOTES

DRAWINGS SHALL NOT BE SCALED.
 STEEL COLUMN PIPE SHALL BE A.P.I. SPEC. 5L GRADE X42 F_y = 289 MPa
 ALL STEEL PIPE MEMBERS OF TRUSS SHALL BE A.P.I. SPEC. 5L GRADE X42 F_y = 289 MPa
 PLATES, BARS, STRUCTURAL ANGLES SHALL BE A.S.T.M. A709 GRADE 36 F_y = 248 MPa
 ALL STRUCTURAL STEEL MEMBERS SHALL BE GALVANIZED.
 ALL BOLTED CONNECTIONS SHALL BE MADE WITH M20 A325M BOLTS, GALVANIZED A.S.T.M. A153, CLASS C.
 WELDED CONNECTIONS CAN BE USED IN LIEU OF BOLTED CONNECTIONS, IF UNIT CAN BE GALVANIZED IN ONE PIECE.
 STEEL ANCHOR BOLTS SHALL BE A.A.S.H.T.O. M314-90 GRADE 380. F_y = 380 MPa
 SIGNS OR BLANKS SHALL BE INSTALLED ON TRUSS AT TIME OF ERECTION.
 BLANKS SHALL BE 1/4 THE LENGTH OF THE BRIDGE, 610 mm DEEPER THAN C TO C OF CHORDS & SHALL BE CENTERED ON THE BRIDGE. SIGNS SHALL BE AS DESIGNATED IN PLANS.
 THE UPPER 300 mm OF ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE A.A.S.H.T.O. SPECIFICATION AS STATED IN SECTION 641 OF THE WIS. D.O.T. STANDARD SPECIFICATIONS.
 WELD TEST AS PER AWS D1.1.

DESIGN DATA

DEAD LOAD - WT. OF SIGN, SUPPORTING STRUCTURE, CATWALK, LIGHTS AND RAILINGS.
 LIVE LOAD - SINGLE LINE LOAD OF 2.3 kN DISTRIBUTED OVER 610 mm OF CATWALK.
 ICE LOAD - 144 Pa TO 1FACE OF SIGN & AROUND SURFACE OF MEMBERS.
 WIND PRESSURE - 137 km/h TO SIGN AREA & EXPOSED MEMBERS.

WIND COMPONENTS	NORMAL	TRANSVERSE
COMBINATION 1	1.0	0.2
COMBINATION 2	0.6	0.3
GROUP LOADS	% OF ALLOWABLE STRESS	
1. DEAD	100	
2. DEAD + WIND	140	
3. DEAD + ICE + 1.2 KPA WIND	140	

TABLE

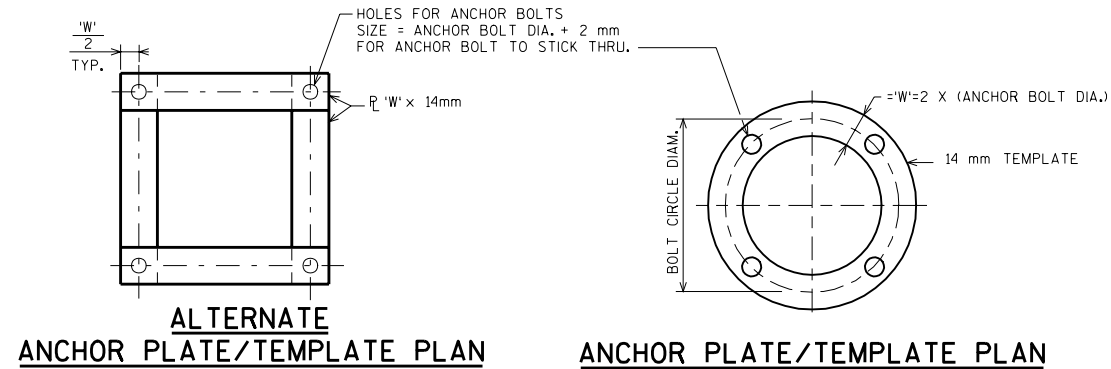
STRUCTURE	A	B	C	CHORDS O.D. X THK.	TOP & BOTTOM WEB	FRONT & REAR WEB	COUPLING PLATE "D1" & "T"	BOLT CIRCLE DIA. "D2"	NO. OF BOLTS IN COUPLING	CAMBER	COLUMN O.D. X THK.	TOWER WEBS	"L"

TO BE DESIGNED

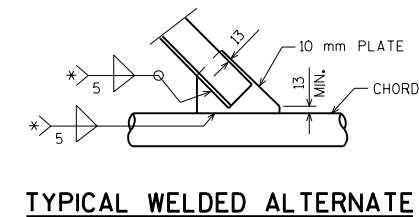
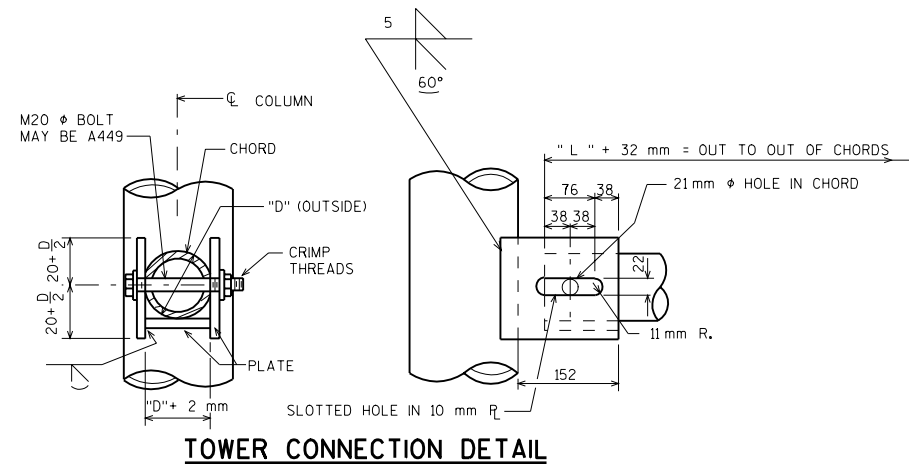
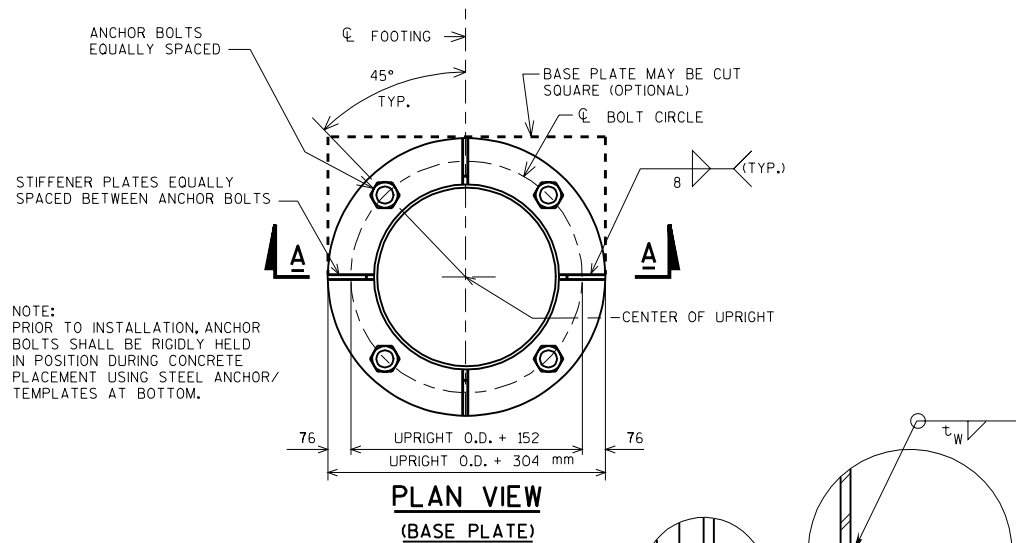
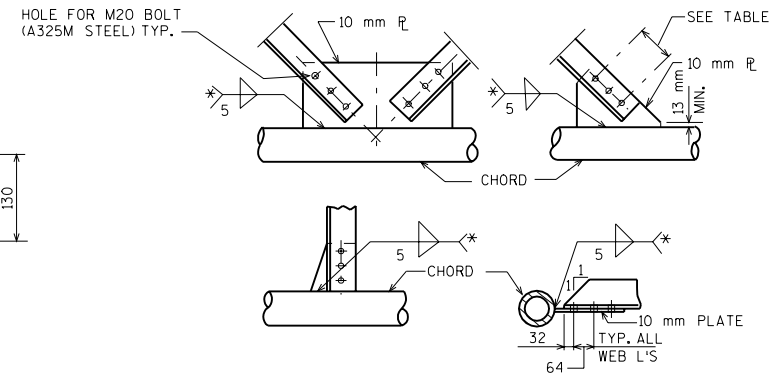
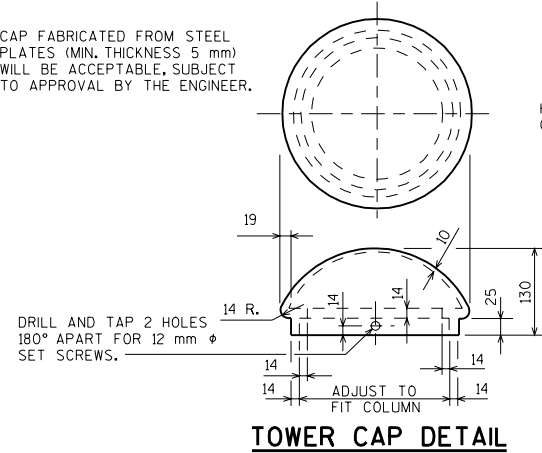
4-CHORD GALVANIZED STEEL
SIGN BRIDGE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

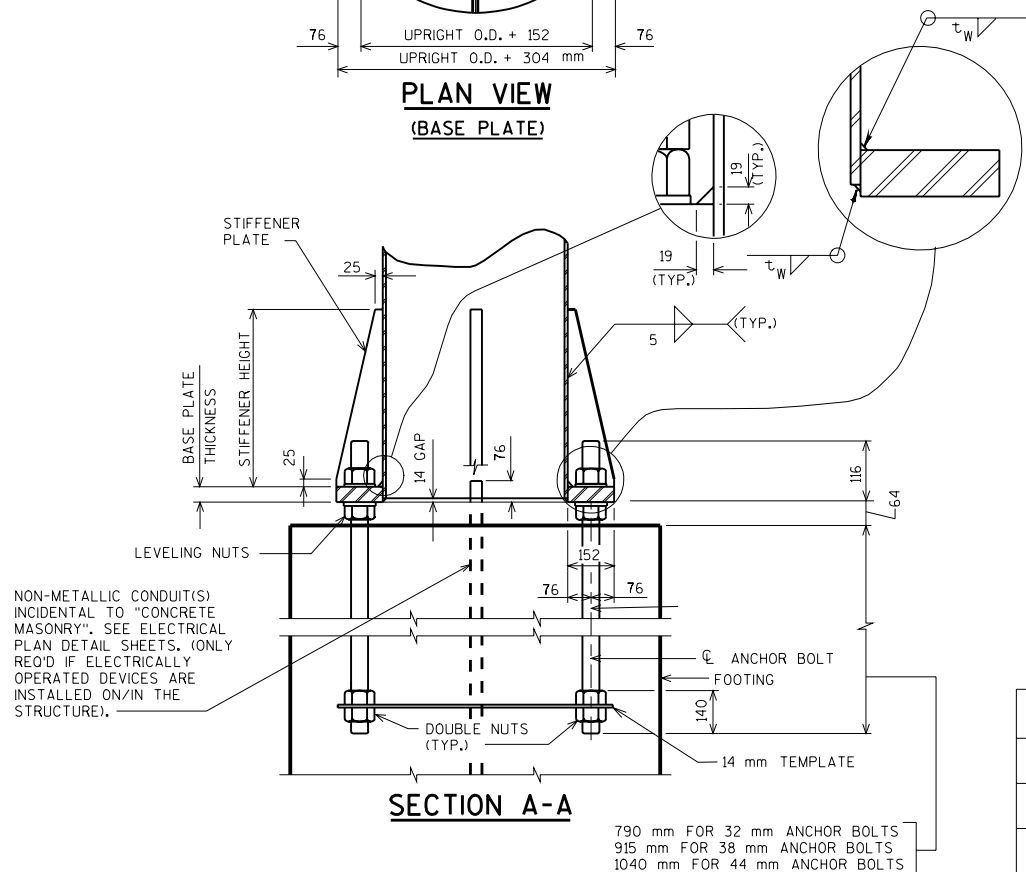
APPROVED: _____ DATE: 1/99



CAP FABRICATED FROM STEEL PLATES (MIN. THICKNESS 5 mm) WILL BE ACCEPTABLE, SUBJECT TO APPROVAL BY THE ENGINEER.



*ANGLE	WELD LENGTH	NO. OF BOLTS
64x64x6.4	280 mm	3
76x76x4.8	255 mm	3
76x76x6.4	330 mm	4
76x76x7.9	420 mm	5
76x76x9.5	495 mm	6
102x102x6.4	460 mm	5
102x102x7.9	560 mm	6
102x102x9.5	660 mm	8
102x102x11.1	765 mm	9
102x102x12.7	865 mm	10

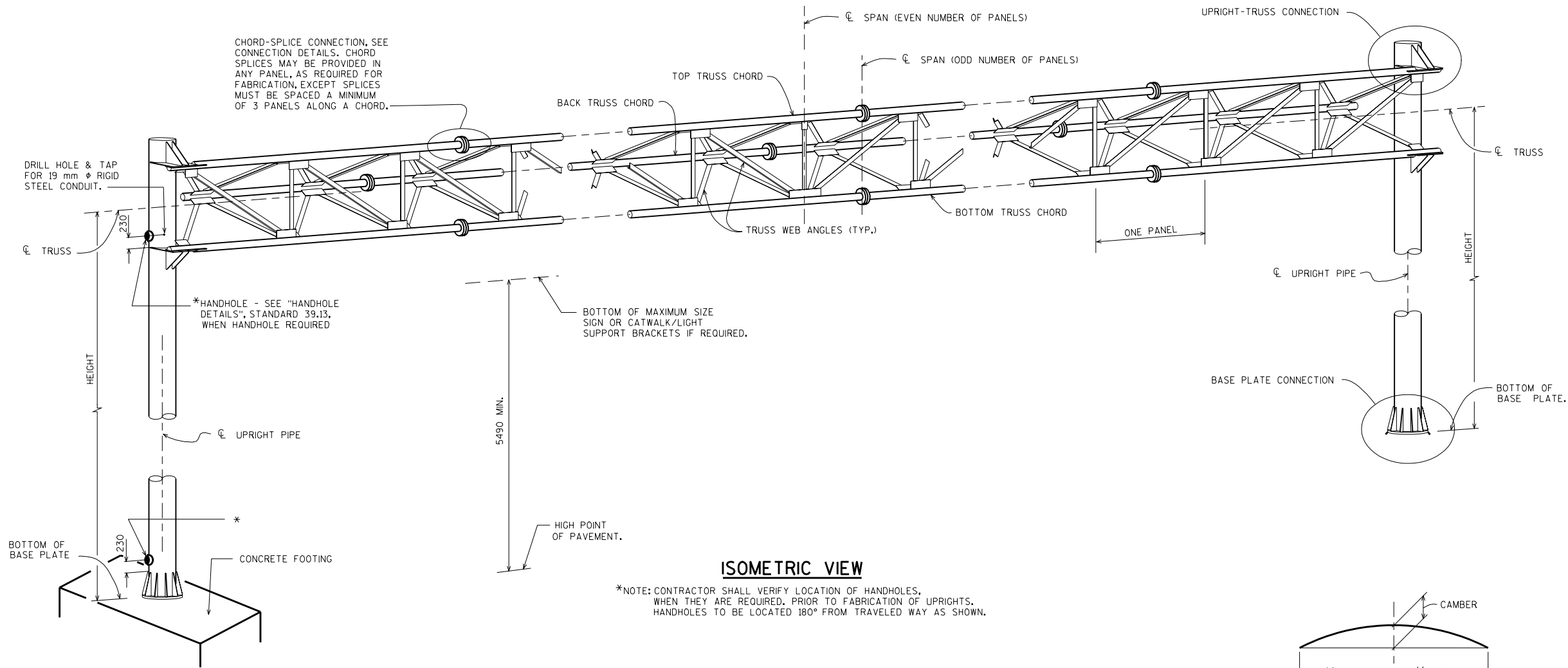


BASE PLATE & UPRIGHT COLUMN DETAILS

STRUCTURE	COLUMN O.D. X THK.	ANCHOR BOLTS	BASE PLATE THICKNESS (mm)	STIFFENER PLATE THICKNESS (mm)	STIFFENER PLATE HEIGHT (mm)	t_w (mm)

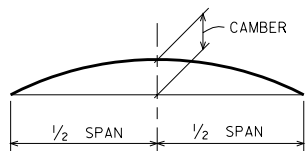
TO BE DESIGNED

4-CHORD SIGN BRIDGE DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/99



ISOMETRIC VIEW

*NOTE: CONTRACTOR SHALL VERIFY LOCATION OF HANDHOLES, WHEN THEY ARE REQUIRED. PRIOR TO FABRICATION OF UPRIGHTS, HANDHOLES TO BE LOCATED 180° FROM TRAVELED WAY AS SHOWN.



CAMBER DIAGRAM

SPAN SIGN STRUCTURE NOTES

- 1) SIGN STRUCTURE MATERIALS SHALL BE AS FOLLOWS:
UPRIGHT & CHORDS (STEEL PIPE) -> API-5L-X42 (289 MPa YIELD)
WEBS AND SPLICES (STEEL ANGLES) -> ASTM A709M GRADE 250
STEEL PLATES -> ASTM A709M GRADE 250
WELD METAL -> E480XX
BOLTS (EXCEPT ANCHOR BOLTS) -> ASTM A325M
- 2) STEEL ANCHOR BOLTS SHALL BE AASHTO 314 GRADE 380. NUTS FOR ANCHOR BOLTS SHALL BE ASTM A563M GRADE A HEAVY HEX.
- 3) ALL STEEL ITEMS SHALL BE GALVANIZED AS FOLLOWS:
STRUCTURAL SHAPES AND PLATES -> ASTM A 123
ALL NUTS, BOLTS AND WASHERS -> ASTM A 153 CLASS C OR D DEPENDING ON SIZE
- 4) ALL HIGH STRENGTH BOLTS, NUTS, AND WASHERS, EXCEPT ANCHOR BOLTS AND SIGN CONNECTION U-BOLTS SHALL MEET THE REQUIREMENTS OF STANDARD SPEC. 506.2.5 AND BE INSTALLED IN ACCORDANCE WITH STANDARD SPEC. 506.3.12. ANCHOR BOLTS SHALL HAVE DOUBLE NUTS.
- 5) CONCRETE SHALL BE GRADE A WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH (F'c) OF 24 MPa FOR ALL ENVIRONMENTAL CLASSIFICATIONS.
- 6) REINFORCING STEEL SHALL BE ASTM A615M GRADE 420.
- 7) ALTERNATE DESIGNS FOR THIS STRUCTURE ARE NOT ALLOWED. DIFFERENT SIZE AND STRENGTH OF MEMBERS MAY BE SUBSTITUTED WITH THE APPROVAL OF THE OFFICE OF DESIGN.
- 8) DO NOT GROUT THE SPACE BETWEEN TOP OF FOOTING AND BOTTOM OF BASE PLATE.
- 9) SHOP DRAWINGS FOR THIS STRUCTURE ARE REQUIRED AND FABRICATION SHALL NOT BEGIN UNTIL THESE SHOP DRAWINGS ARE APPROVED.
- 10) THE STRUCTURE MUST BE ASSEMBLED AFTER GALVANIZING AND PRIOR TO SHIPMENT TO THE SITE TO ASSURE FIT UP. IT MAY BE DISASSEMBLED IN SECTIONS FOR SHIPPING. ALL HIGH STRENGTH BOLTED CONNECTIONS (WEB TO CHORD GUSSET) BETWEEN CHORD SPLICE POINTS SHALL BE FULLY TIGHTENED IN THE SHOP. THE TOWER/CHORD, CHORD SPLICE, AND ACROSS THE SPLICE WEB TO CHORD GUSSET CONNECTIONS SHALL BE FULLY TIGHTENED IN FIELD.
- 11) THE DESIGN WIND SPEED IS 137 km/h WITH A 30 PERCENT GUST FACTOR.
- 12) PROVIDE A CAMBER WITH THE MAXIMUM UPWARD DEFLECTION AS CALLED FOR ON THE CAMBER DIAGRAM. INDICATE ON THE SHOP DRAWINGS THE METHOD TO BE USED TO PROVIDE THE REQUIRED CAMBER.
- 13) SIGN PANELS ATTACHED TO THE TRUSS SHALL BE CENTERED (IN ELEVATION) ON THE STRUCTURE. SIGN PANELS SHALL BE ALUMINUM.
- 14) EXCEPT FOR ANCHOR BOLTS, ALL BOLT HOLE DIAMETERS SHALL BE EQUAL TO THE BOLT DIAMETER PLUS 2 mm. PRIOR TO GALVANIZING, HOLE DIAMETERS FOR ANCHOR BOLTS SHALL NOT EXCEED THE BOLT DIAMETER PLUS 13 mm.
- 15) CONTRACTOR SHALL ATTACH SIGN PANELS TO THE TRUSS CHORDS AS SHOWN ON "TYPICAL SIGN CONNECTION", STANDARD 39.5. SIGN PANELS AND HARDWARE REQUIRED TO ATTACH SIGNS TO TRUSS CHORDS, INCLUDING ALL W130 X 5.5 ALUMINUM SIGN SUPPORT BRACKETS, U-BOLTS, AND POST CLIP HARDWARE, WILL BE SUPPLIED AND DELIVERED TO SITE BY OTHERS.
- 16) ANCHOR BOLTS SHALL BE PROVIDED WITH TEMPLATES TOP AND BOTTOM TO MAINTAIN VERTICAL ALIGNMENT AND SPACING DURING CONCRETE PLACEMENT. TEMPLATES MAY NOT BE WELDED TO THE ANCHOR BOLTS.
- 17) SIGNS OR BLANKS SHALL BE INSTALLED ON TRUSS AT TIME OF ERECTION. BLANKS SHALL BE 1/4 THE LENGTH OF BRIDGE, 610 mm DEEPER THAN C TO C OF CHORDS & SHALL BE CENTERED ON THE BRIDGE.
- 18) SHOP WELDED CONNECTIONS MAY BE USED IN LIEU OF BOLTED CONNECTIONS IN TRUSS IF UNIT CAN BE GALVANIZED IN ONE PIECE.
- 19) ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

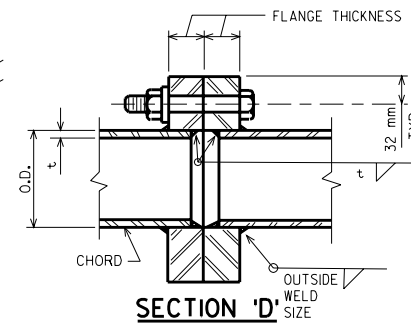
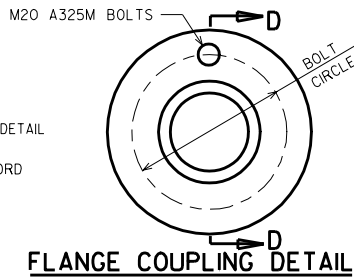
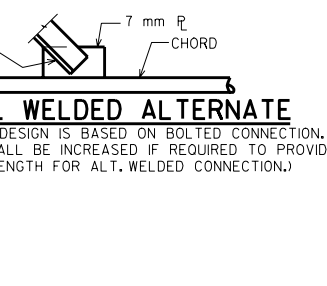
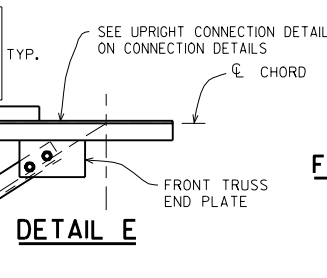
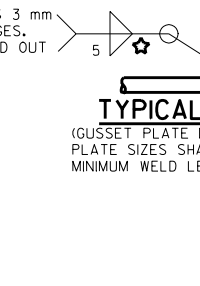
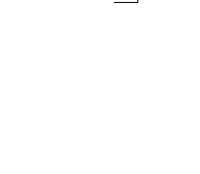
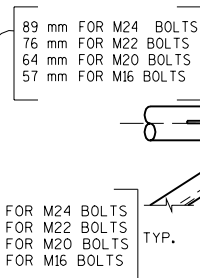
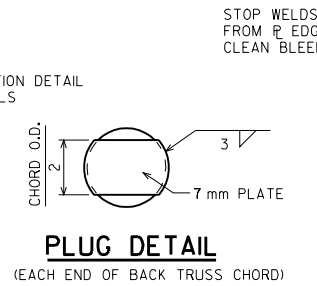
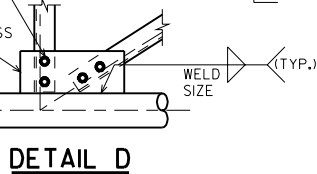
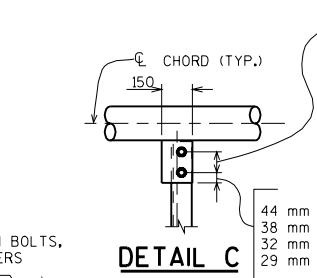
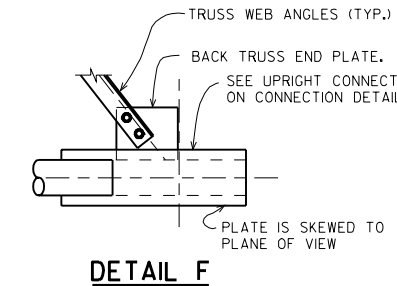
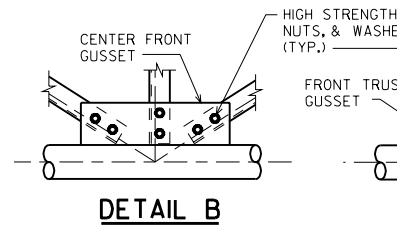
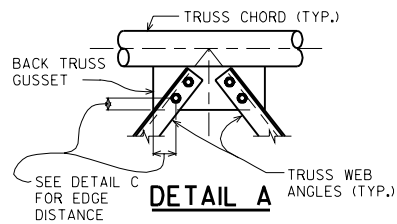
3-CHORD STEEL SIGN BRIDGE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:

4/99



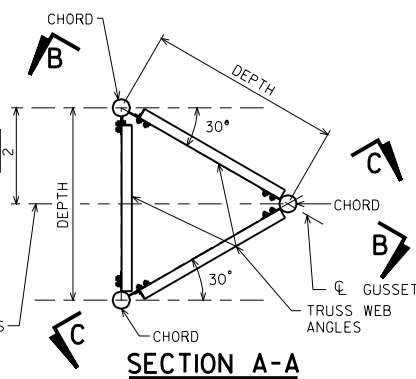
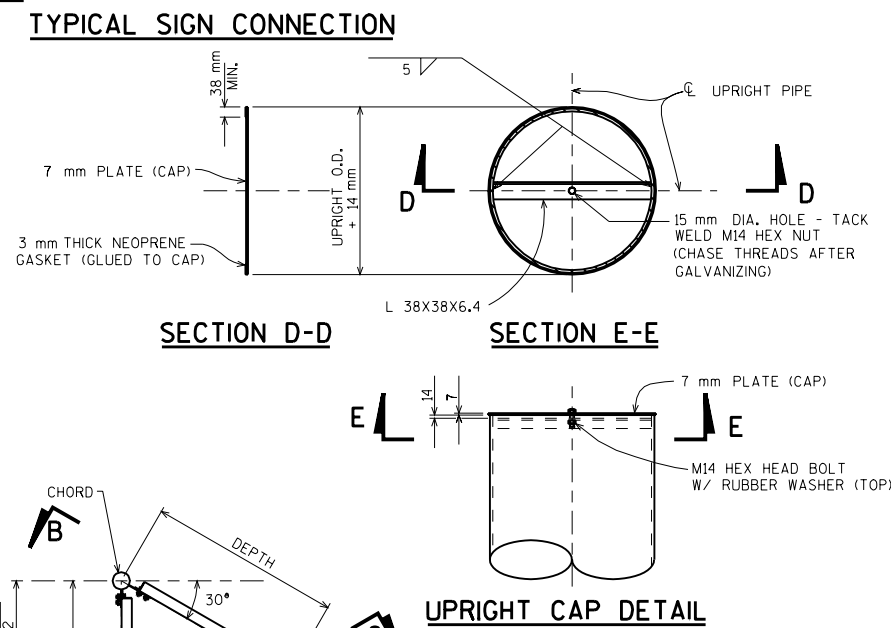
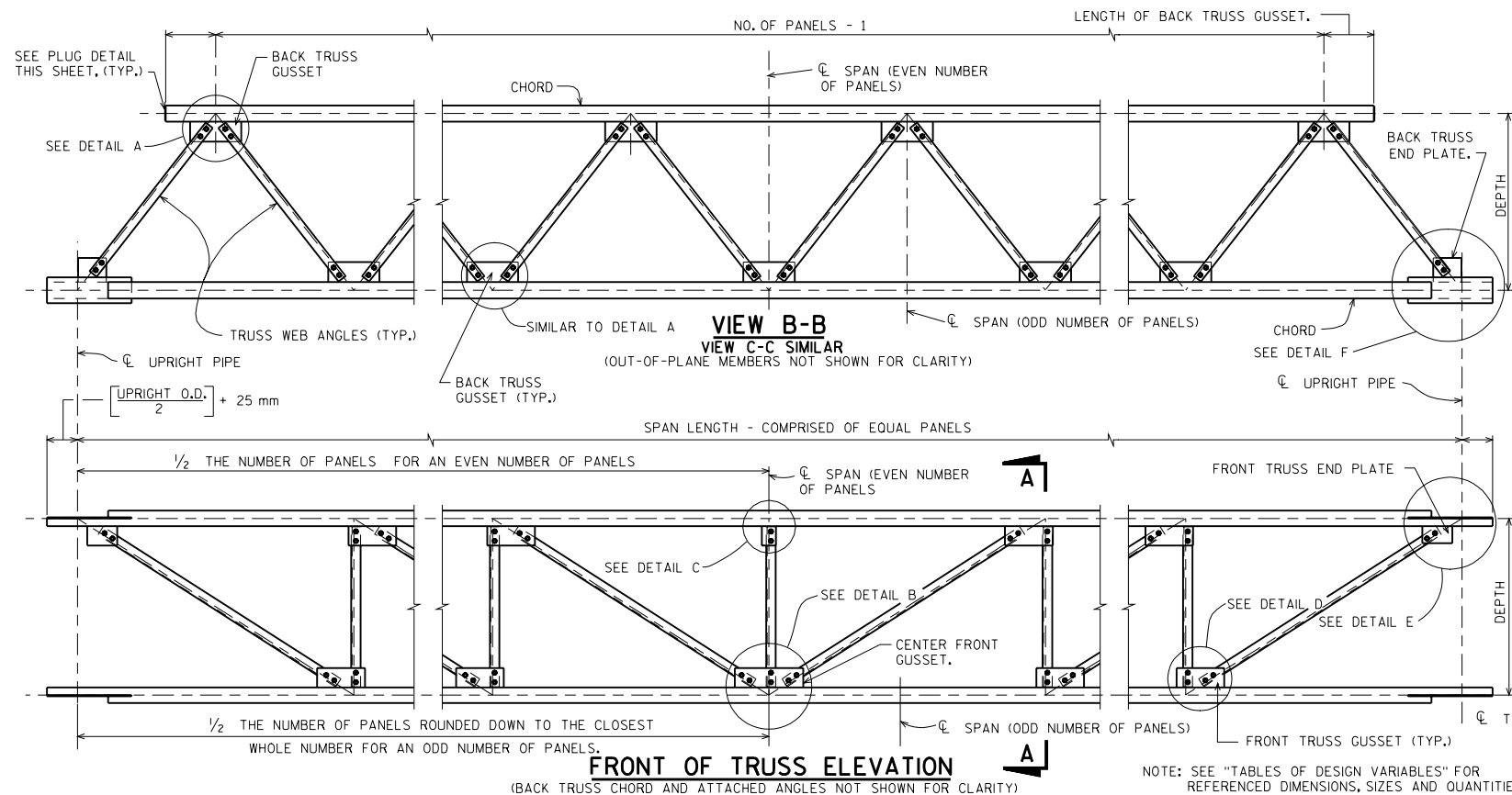
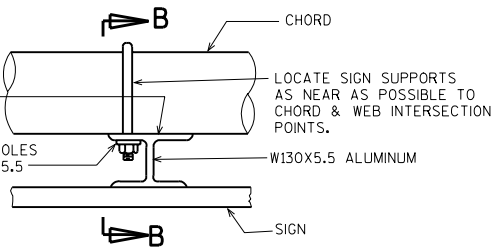
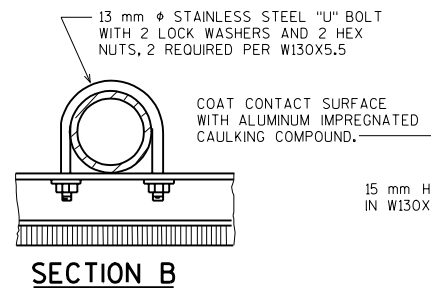
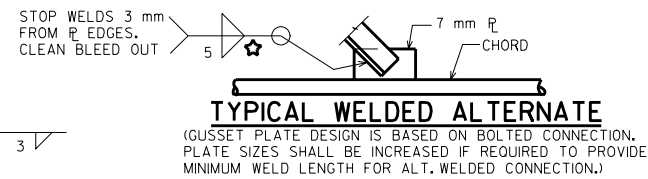
COUPLING DESIGN

*CHORD SIZE (O.D. X t)	NUMBER OF BOLTS REQ'D.	BOLT CIRCLE DIAMETER	FLANGE THICKNESS	OUTSIDE WELD SIZE

*PIPE OUTSIDE DIAM. IN mm X PIPE WALL THICKNESS IN mm

MINIMUM LENGTH OF 5 mm WELD

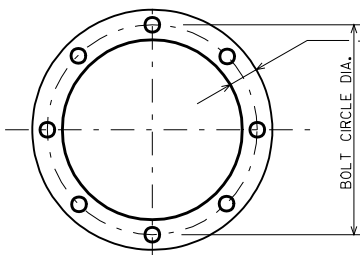
BOLT SIZE	MINIMUM LENGTH OF 5 mm WELD
M16	165
M20	240
M22	320
M24	420



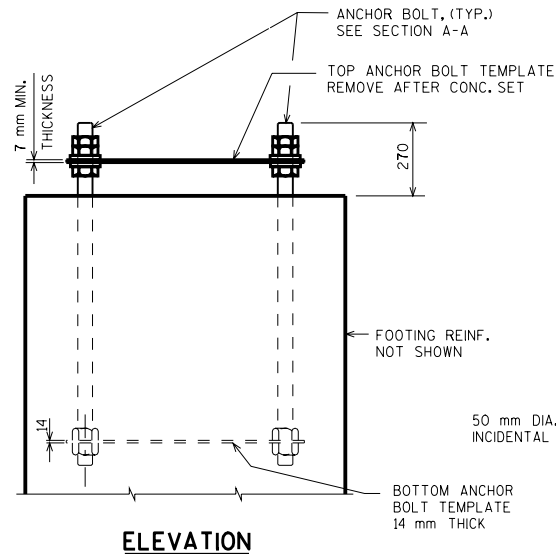
3-CHORD STEEL SIGN BRIDGE TRUSS ELEVATION

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

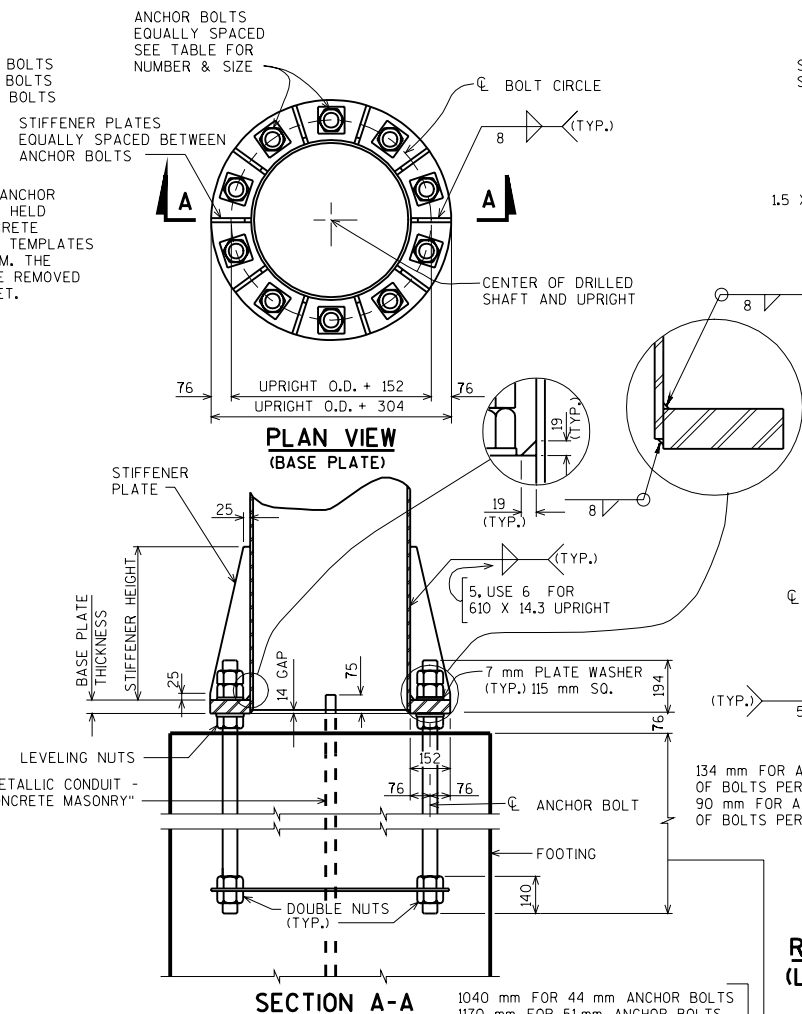
APPROVED: _____ DATE: 4/99



TOP VIEW OF TOP & BOTTOM TEMPLATES

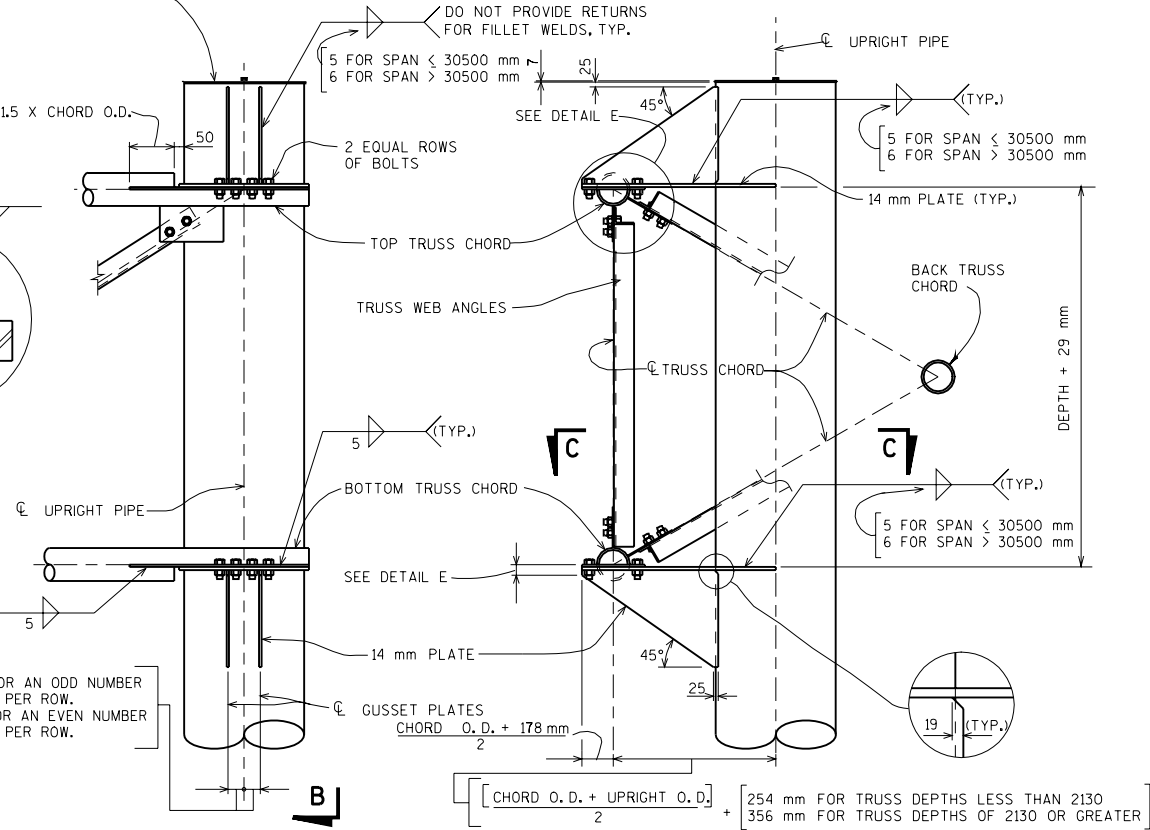


ELEVATION



SECTION A-A

SEE "UPRIGHT CAP DETAIL" STANDARD 39.5

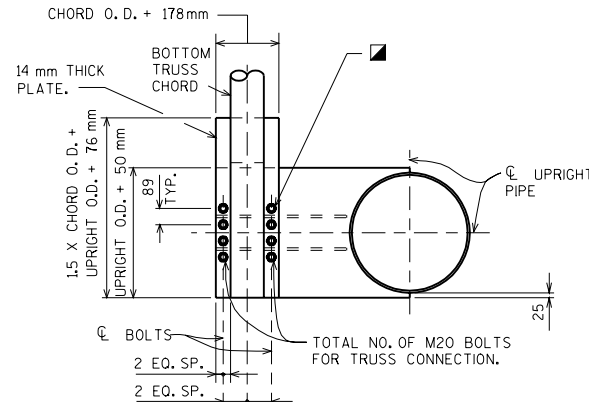


RIGHT UPRIGHT-TRUSS CONNECTION DETAIL (LEFT UPRIGHT -TRUSS CONNECTION SIMILAR)

WEB MEMBERS FROM BACK TRUSS CHORD OMITTED FOR CLARITY

VIEW B-B

SHOP DRILL HOLES IN PLATE WELDED TO BOTTOM CHORD. FIELD DRILL HOLES IN BOTTOM PLATE WELDED TO UPRIGHT. SHOP DRILL HOLES IN TOP PLATE WELDED TO UPRIGHT. FIELD DRILL HOLES IN PLATE WELDED TO TOP CHORD.



SECTION C-C (WITH GUSSET PLATE AND ANGLES OMITTED FOR CLARITY)

3-CHORD STEEL SIGN BRIDGE CONNECTION AND BASE DETAILS

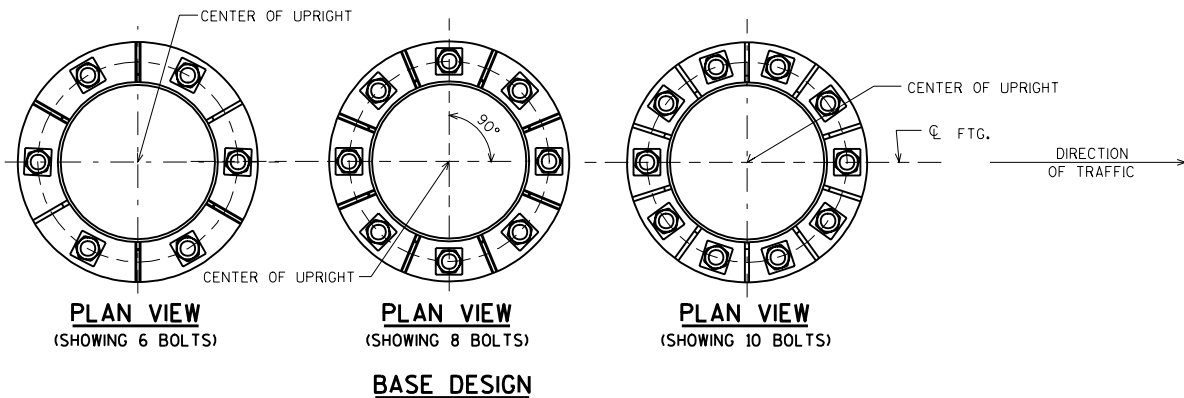
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 4/99

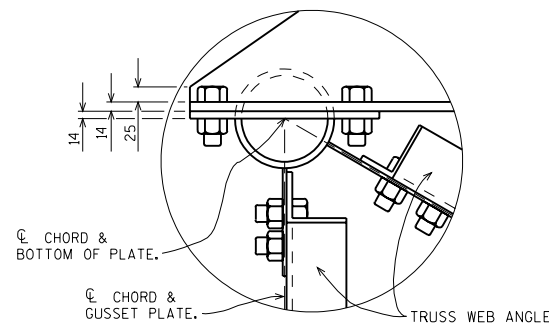
TO BE DESIGNED

* UPRIGHT SIZE	ANCHOR BOLTS	BASE PLATE THICKNESS	STIFFENER PLATE THICKNESS	STIFFENER PLATE HEIGHT

*PIPE OUTSIDE DIAMETER IN mm X PIPE WALL THICKNESS IN mm



BASE DESIGN



DETAIL E

TRUSS DESIGN								
STRUCTURE	SPAN (mm)	DEPTH (mm)	CHORD SIZE ①	WEB ANGLE SIZE (mm)	PANELS (NO. & LENGTH)	WEB BOLT SIZE	TRUSS CONN. ②	CAMBER (mm)

GUSSET PLATE DESIGN								
STRUCTURE	SPAN (mm)	THICK- NESS	BACK TRUSS	FRONT TRUSS	CENTER FRONT	BACK TRUSS END PLATE	FRONT TRUSS END PLATE	WELD SIZE

- ① OUTSIDE DIAMETER (O.D.) X WALL THICKNESS IN MILLIMETERS.
- ② NUMBER OF A325 19 MM ϕ BOLTS PER CONNECTION.
(NOTE: ONE TRUSS HAS FOUR CONNECTIONS.)
- ③ "HEIGHT" IS MEASURED FROM ϕ TRUSS TO BOTTOM OF BASE PLATE.
LEFT AND RIGHT SIDES ARE WITH RESPECT TO THE DIRECTION VIEWED
FROM AS SHOWN ON "SIGN BRIDGE LAYOUT" SHEET.

UPRIGHT DESIGN				
STRUCTURE	SPAN (mm)	"HEIGHT" (mm) ③		UPRIGHT SIZE ①
		LEFT	RIGHT	

- NOTES
- DESIGN IS TO BE BASED ON THE FOLLOWING:
1. MAXIMUM SIGN DEPTH = 3650 mm

2. SIGN AREA EQUAL TO (6 X SPAN) X 3650 mm HIGH.

3. NO CATWALK.

4. ONE DIRECTION TRAFFIC (SIGNS ON ONE SIDE).

5. NO FUTURE WIDENING OR RAISING OF STRUCTURE PLANNED.

6. TYPE 1 SIGN PANELS (EXTRUDED ALUMINUM SECTIONS WITH REFLECTIVE BACKING) & ALUMINUM BRACKETS.

7. DESIGN 4 CHORD SYSTEM (PER STANDARD 39.2 & 39.3) WHEN ANY OF CRITERIA (1) THROUGH (6) ARE VIOLATED.

8. SIGNS TO BE CENTERED ON TRUSS.

9. DESIGNER IS TO PROVIDE DESIGN (FILL IN DESIGN VARIABLE BOXES IN TABLE ABOVE AND AS SHOWN ON STANDARDS 39.5 & 39.6) FOR EACH SIGN BRIDGE STRUCTURE. OTHER DETAILS SHOWN IN STD. 39.5 & 39.6 ARE ADEQUATE PROVIDED THE CRITERIA SHOWN ABOVE AND IN THE BRIDGE MANUAL ARE FOLLOWED.

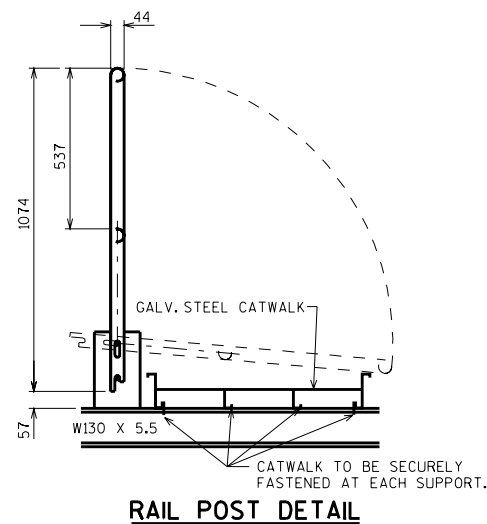
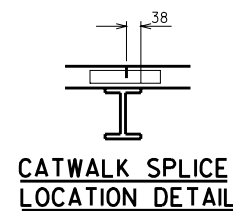
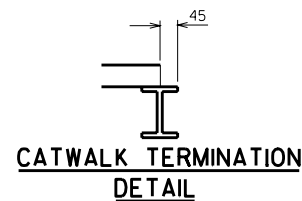
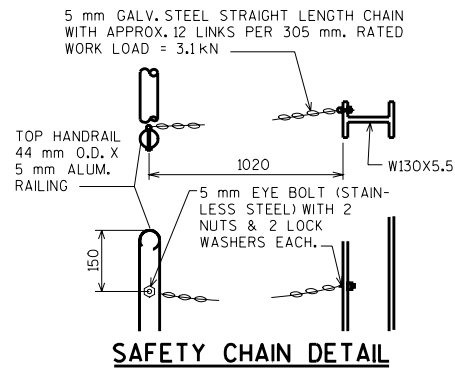
10. STRUCTURE IS ANALYZED AS A SPACE FRAME WITH CHORDS BEING CONSIDERED CONTINUOUS MEMBERS PINNED TO THE UPRIGHT BRACKETS. WEB MEMBERS ARE CONSIDERED PINNED AT ENDS BUT ARE DESIGNED FOR ECCENTRIC END CONNECTIONS.

3-CHORD STEEL SIGN BRIDGE
DESIGN VARIABLES

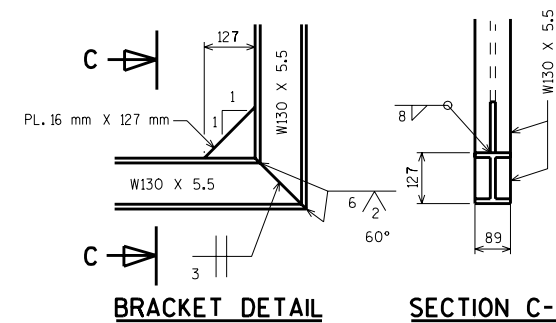
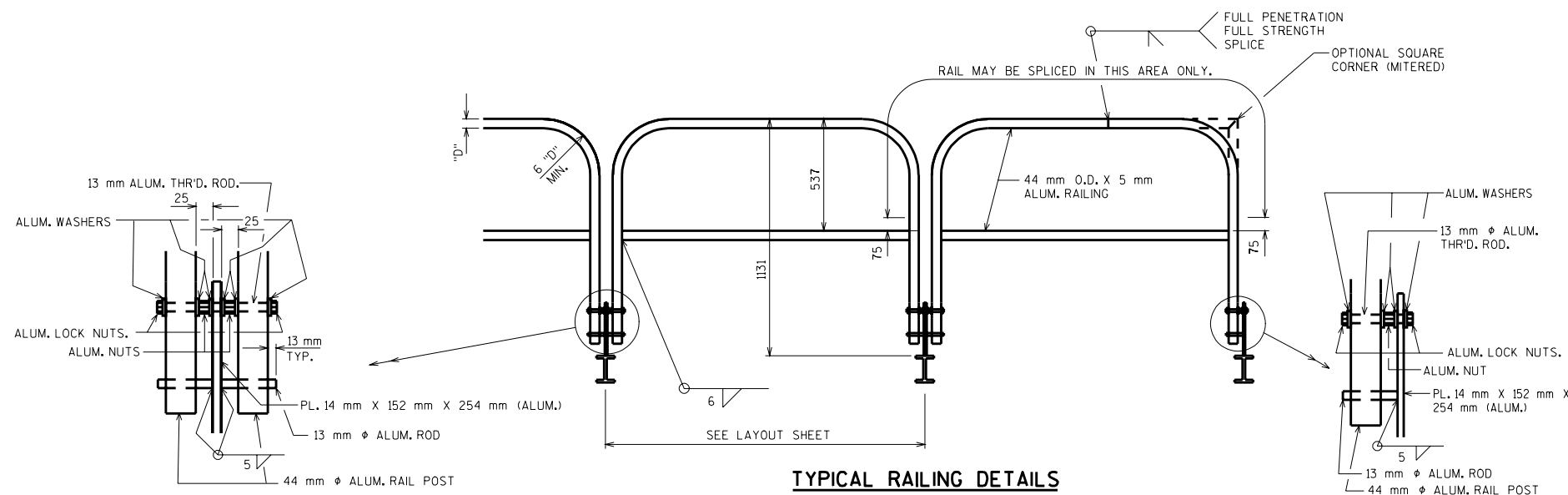
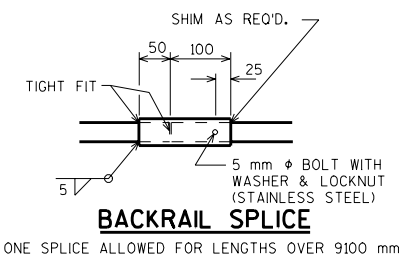
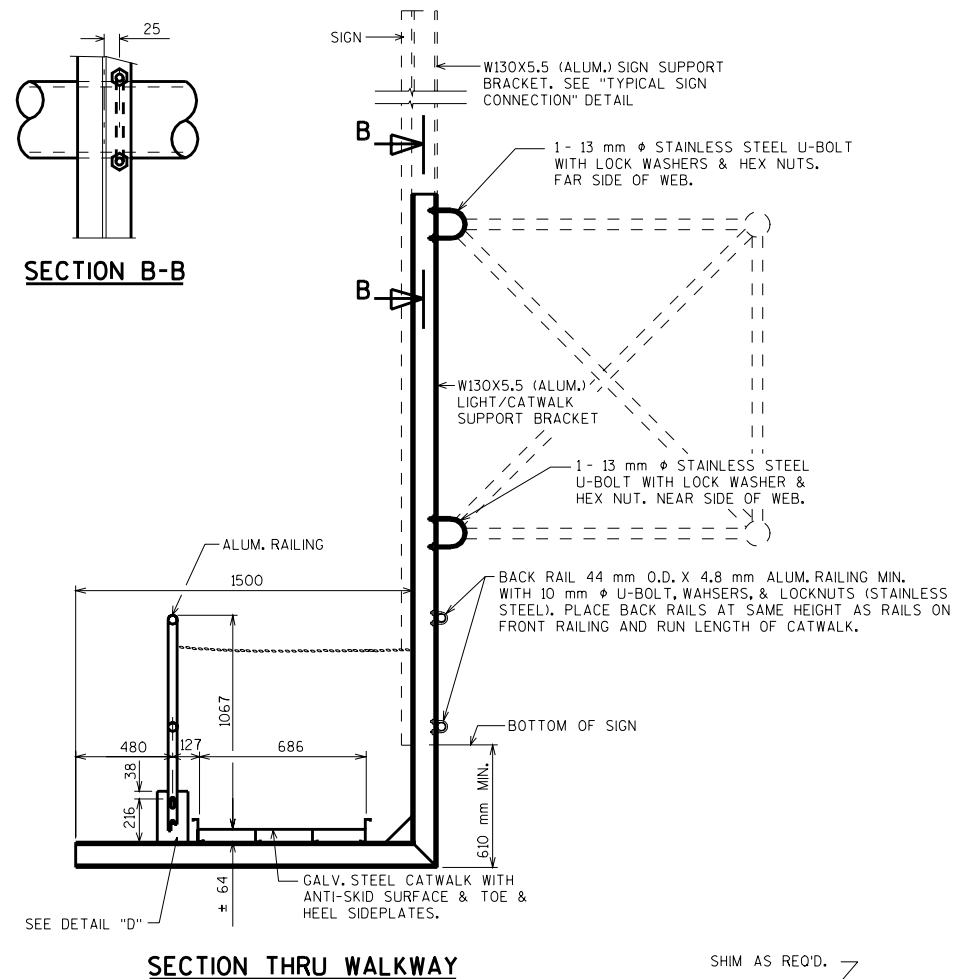
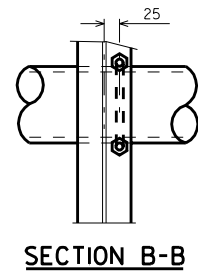
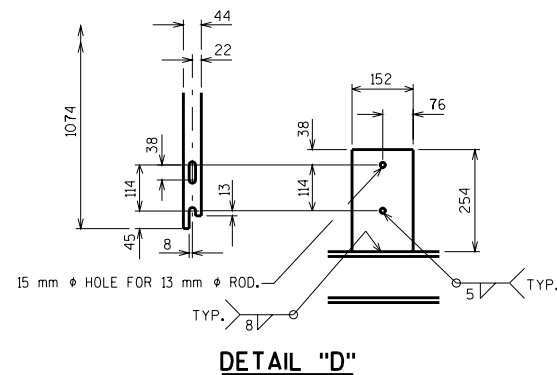
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99



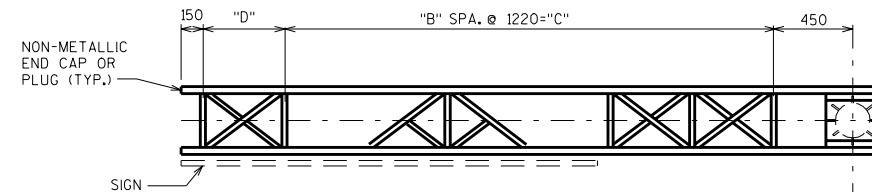
NOTE:
CATWALK SHALL MEET A.A.S.H.T.O. "SPECIFICATIONS FOR THE DESIGN & CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS" 1985. (2.3 kN DISTRIBUTED OVER 610 mm TRANSVERSELY WITH THE BASIC ALLOWABLE UNIT STRESS - A.A.S.H.T.O. HIGHWAY BRIDGES 1985 (INCREASED 25%), MAX. SPAN IS 2400 mm. CATWALK SHALL ALSO MEET O.S.H.A. 1970 STD'S. FOR WALKING-WORKING SURFACES.



SECTION C-C

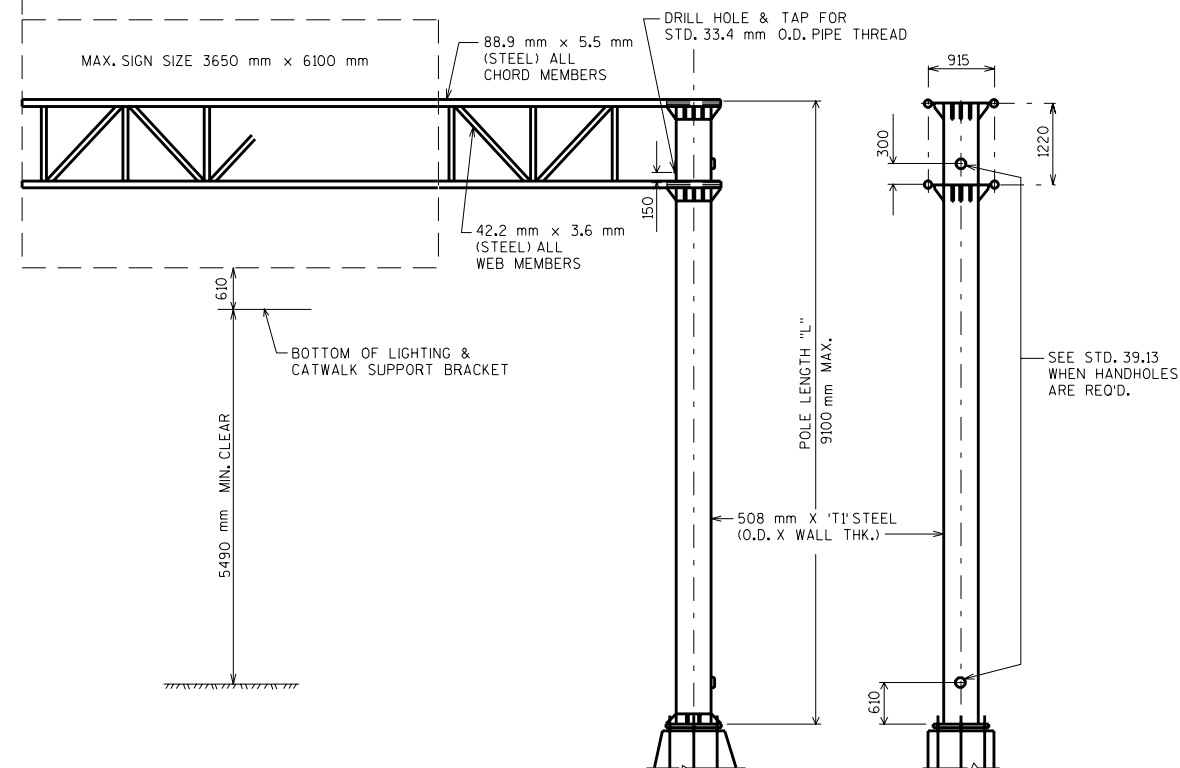
SIGN BRIDGE CATWALK	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 4/99

END PANEL "D" = 610 mm MINIMUM
= 1830 MAXIMUM



PLAN

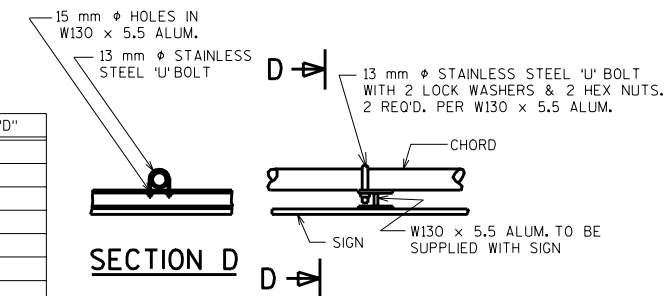
LENGTH "A" END OF TRUSS TO C COLUMN
10100 mm MAX.



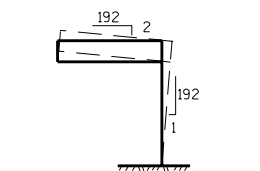
ELEVATION

STRUCTURE	"A"	"L"	"B"	"C"	"T1"	"D"

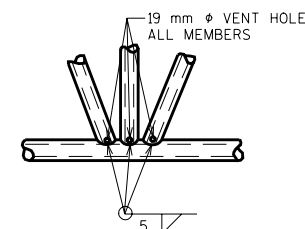
END VIEW



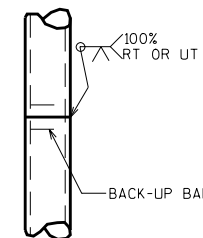
TYPICAL SIGN CONNECTION



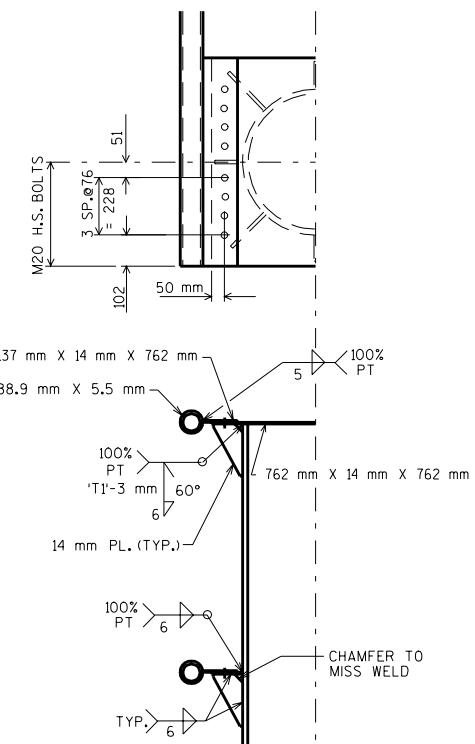
CAMBER DIAGRAM



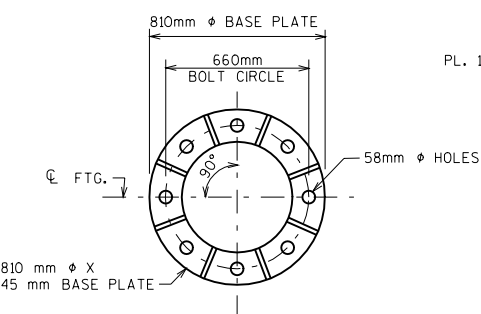
TRUSS JOINT DETAILS



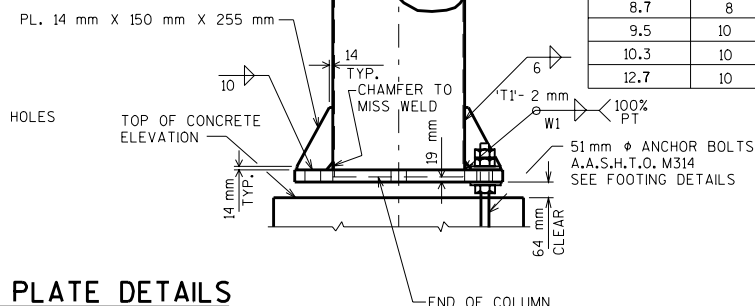
OPTIONAL COLUMN OR CHORD SPLICE DETAIL



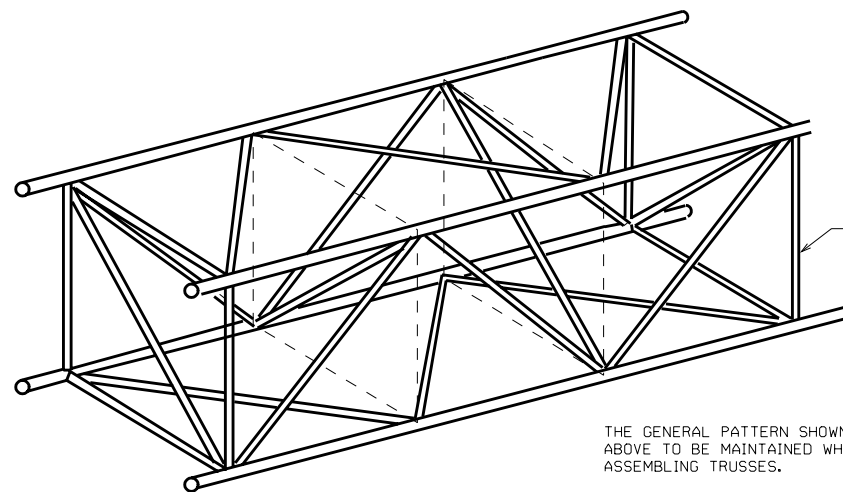
TRUSS TO COLUMN CONNECTION DETAILS



BASE PLATE DETAILS



WELD SIZE 'W1'	POLE 'T1'	'W1'
7.1	6	
7.9	6	
8.7	8	
9.5	10	
10.3	10	
12.7	10	



TYPICAL TRUSS SECTION

THE GENERAL PATTERN SHOWN ABOVE TO BE MAINTAINED WHEN ASSEMBLING TRUSSES.

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

DESIGNED ACCORDING TO A.A.S.H.T.O. "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS"

WIND VELOCITY = 137 km/h

ALL DIMENSIONS, THICKNESSES, & WELD SIZES IN MILLIMETERS

ALLOWABLE DESIGN STRESSES

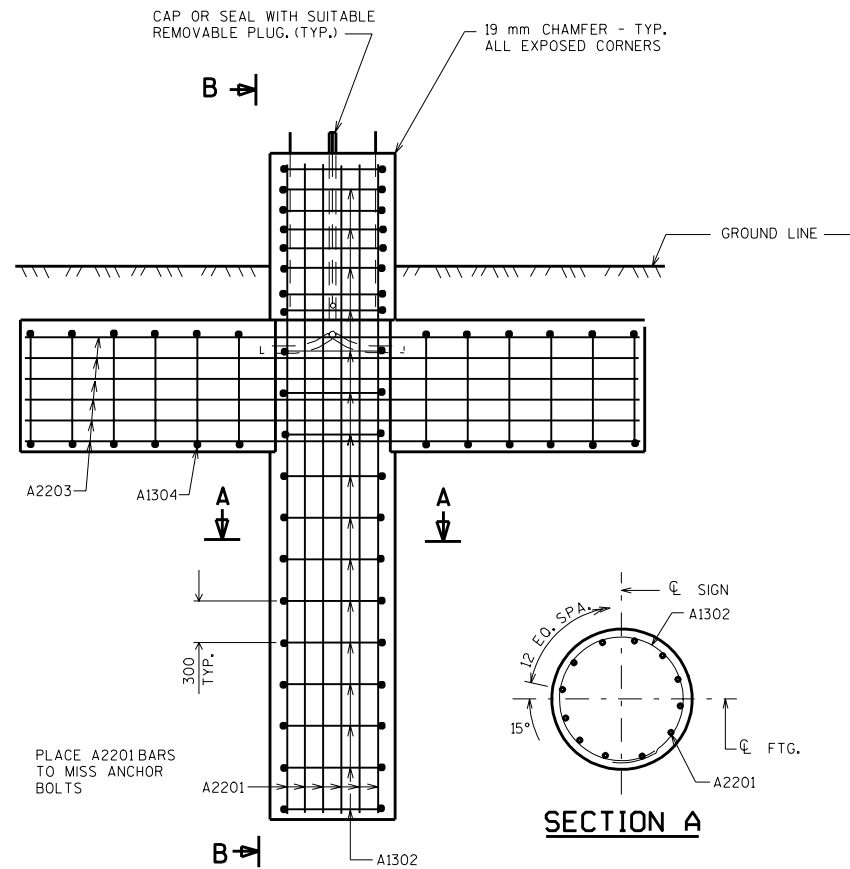
CHORDS & COLUMN (INCLD. HANDHOLE) — API-5L-X42 — $f_y=289$ MPa
ALL OTHER PIPE — A53, GRADE B — $f_y=241$ MPa
PLATES & BARS — A709M — $f_y=248$ MPa
ANCHOR BOLTS — A.A.S.H.T.O. M314 — $f_y=380$ MPa
HIGH STRENGTH BOLTS — A325M — $f_y=635$ MPa
STRUCTURAL MEMBERS GALVANIZED A123
HARDWARE GALVANIZED — A153 CLASS C

GALVANIZED STEEL CANTILEVER SIGN TRUSS

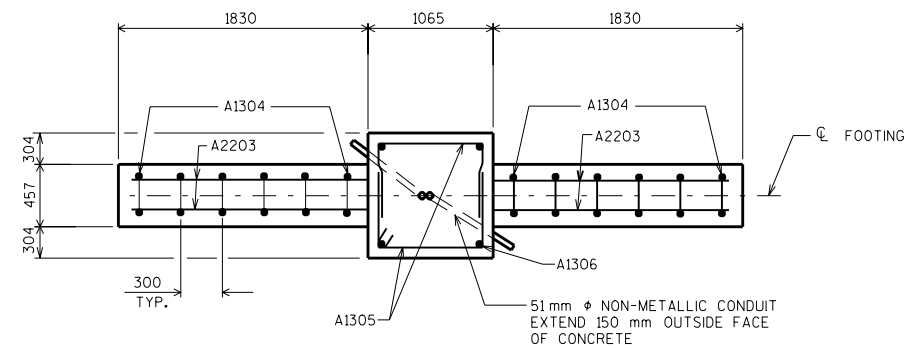
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

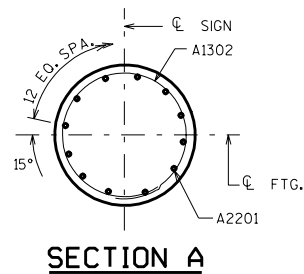
DATE:
4/99



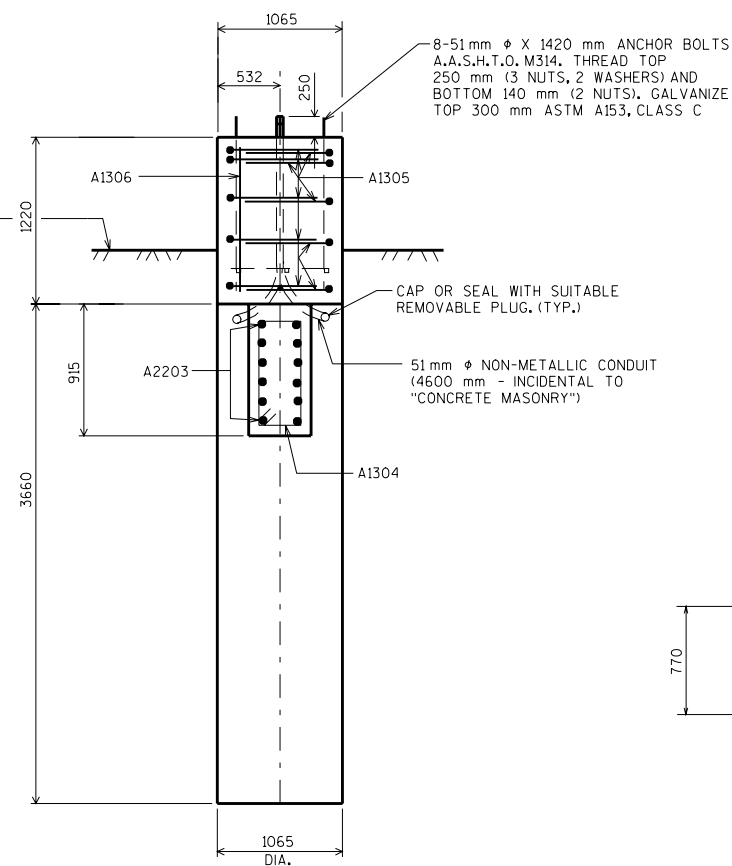
ELEVATION
(6.0 m³/ftg.)



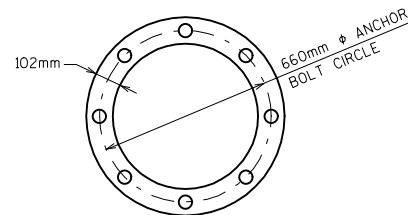
PLAN



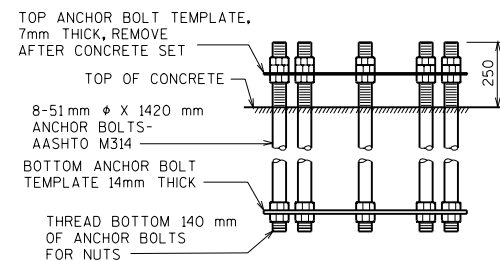
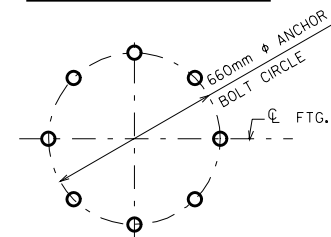
SECTION A



SECTION B



TOP VIEW OF TOP & BOTTOM TEMPLATES



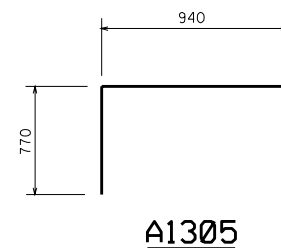
ANCHOR BOLT DETAILS

BILL OF BARS

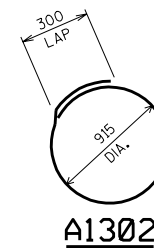
445 kg

BAR MARK	COAT	NO. REQ'D	LENGTH	BEVT	CUT. DIAG.	BUN-DLE	LOCATION
A2201		12	4700				FOOTING - COLUMN/TOP
A1302		16	3200	X			FOOTING - COLUMN/TOP
A2203		12	4570				FOOTING - WINGS
A1304		12	2290	X			FOOTING - WINGS
A1305		10	2410	X			FOOTING - TOP
A1306		4	1070				FOOTING - TOP - COLUMNS

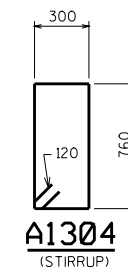
NOTE:
THE FIRST OR FIRST TWO DIGITS OF A
BAR MARK SIGNIFIES THE BAR SIZE.



A1305



A1302



A1304
(STIRRUP)

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.
BAR STEEL REINFORCEMENT SHALL
BE EMBEDDED 75 mm CLEAR UNLESS
DETAILED OTHERWISE.

ALLOWABLE DESIGN STRESSES

CONCRETE MASONRY _____ f'c=24 MPa
HIGH STRENGTH BAR STEEL REINFORCEMENT, _____ f'y=420 MPa
ANCHOR BOLTS A.A.S.H.T.O. M314 _____ f'y=380 MPa

FOUNDATION DATA

ALLOWABLE SOIL BEARING PRESSURE = 192 kPa

TOTAL ESTIMATED QUANTITIES (1 FTG.)

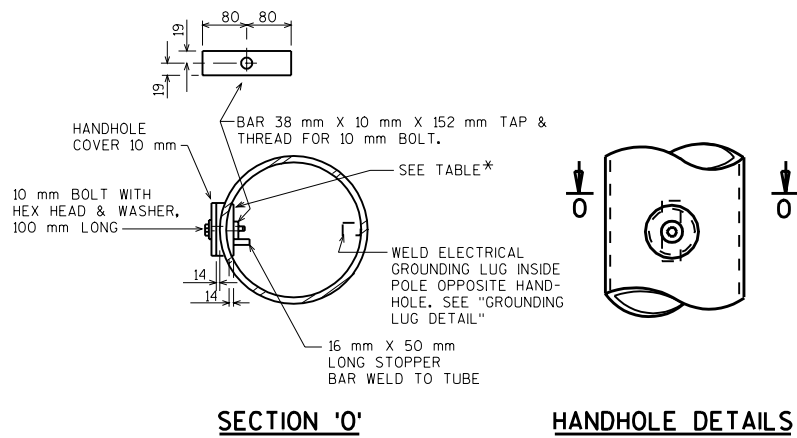
CONCRETE MASONRY, SIGN SUPPORTS _____ 6.0 m³
HIGH STRENGTH BAR STEEL REINFORCEMENT, SIGN SUPPORTS _____ 445 kg

**CANTILEVER
TRUSS FOOTING**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

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4/99

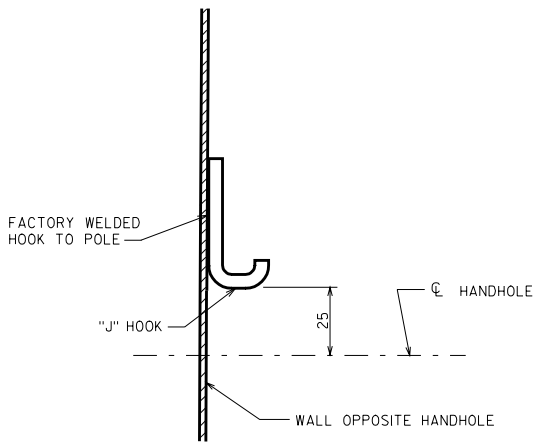


HANDHOLE NOTES

HANDHOLES SHALL BE LOCATED IN ONE COLUMNS OF THE SIGN BRIDGE STRUCTURE IF ELECTRICALLY OPERATED DEVICES ARE INSTALLED ON/IN THE STRUCTURE. COLUMNS WITH HANDHOLES SHALL BE NEAR THE ELECTRICAL SERVICE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THE ELECTRICAL SERVICE ENTRANCE WITH THE DISTRICT TRAFFIC SECTION PRIOR TO FABRICATION OF THE SIGN BRIDGE COLUMNS AND MEMBERS. CONDUIT (AS REQ'D.) SHALL BE LOCATED, PLACED AND SIZED AS SHOWN ON THE ELECTRICAL DETAIL PLAN SHEETS.

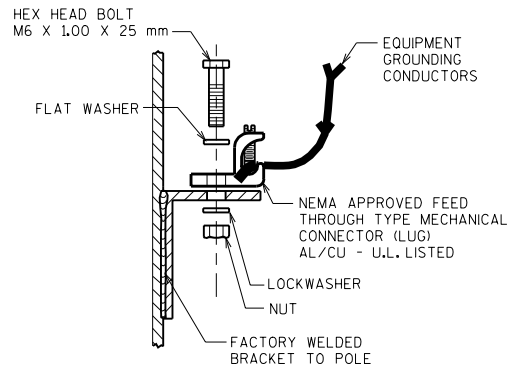
*

UPRIGHT DIAM. SIZE	HANDHOLE PIPE O.D. X MIN. THK.
UP TO AND INCLD. 406.4 mm X 9.5 mm	141.3mm X 12.7mm
GREATER THAN 406.4 mm X 9.5 mm TO AND INCLD. 610.0 mm X 14.3 mm	168.3 mm X 14.3mm



TYPICAL "J" HOOK LOCATION

THE "J" HOOK SHALL BE FACTORY WELDED TO THE INSIDE OF ALL COLUMNS CONTAINING ELECTRICAL WIRING. THE "J" HOOK SHALL BE ATTACHED ABOVE THE CENTERLINE OF THE UPPER HANDHOLE AND MOUNTED DIRECTLY OPPOSITE THE HANDHOLE AS SHOWN IN THE DRAWING.



GROUNDING LUG DETAIL

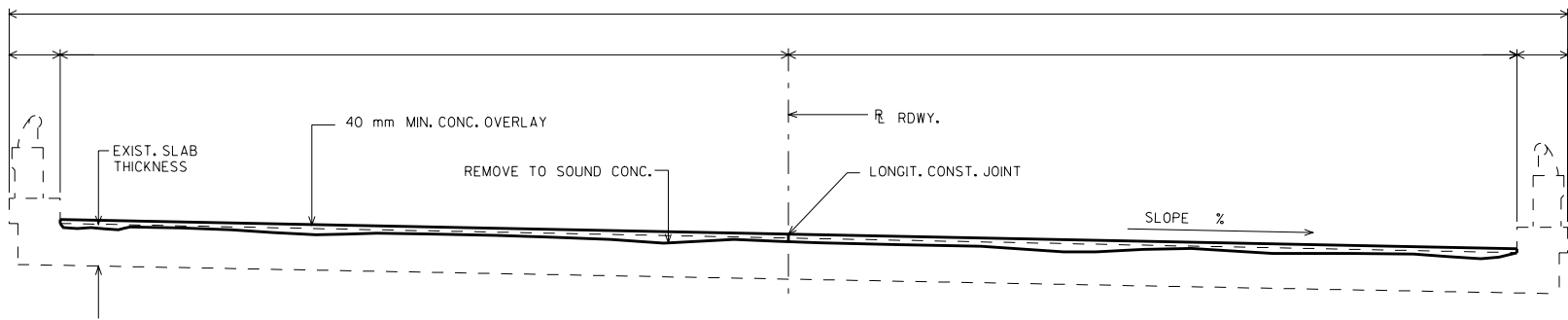
NUT, BOLT AND WASHERS SHALL BE STAINLESS STEEL

HANDHOLE DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

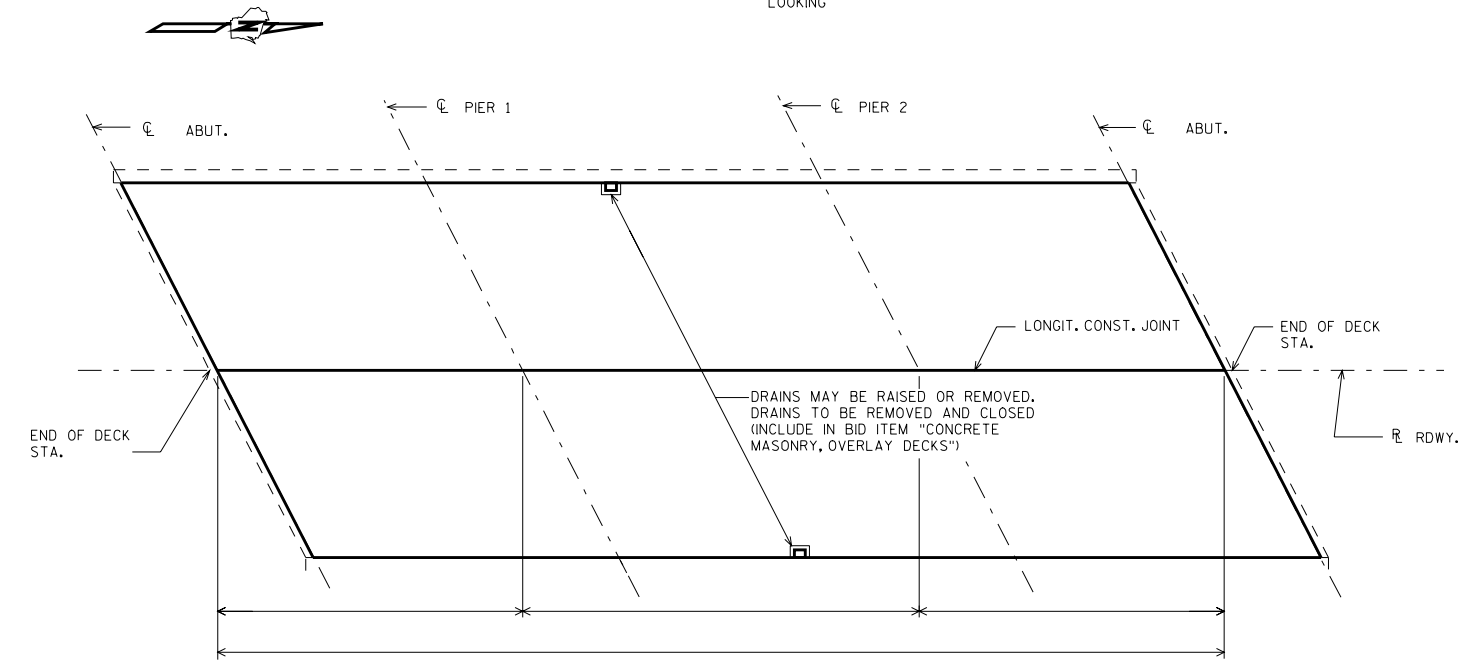
APPROVED: _____

DATE:
4/99



CROSS SECT. THRU RDWY.

LOOKING



PLAN

NOTE:

PROFILE GRADE LINE SHALL BE DETERMINED BASED ON A MINIMUM OVERLAY THICKNESS OF 40 mm PLACED ABOVE THE DECK SURFACE AFTER CLEANING. EXPECTED AVERAGE OVERLAY THICKNESS IS 50 mm (OR AS GIVEN BY THE DESIGN ENGINEER). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN 13 mm, CONTACT THE STRUCTURES DESIGN SECTION.

A MIN. OF 25 mm OF CONCRETE SHALL BE REMOVED FROM THE ENTIRE BRIDGE DECK UNDER THE BID ITEM "CLEANING, DECKS".

TOP OF EXISTING DECK ELEVATIONS SHALL BE DETERMINED FROM A FIELD SURVEY AT LOCATIONS DEEMED NECESSARY FOR ESTABLISHING OVERLAY THICKNESS FOR ACCURATE RATINGS AND POINT OF MINIMUM THICKNESS.

FOR CROSS SECTIONS NOT IN SUPERELEVATION TRANSITIONS THE PREFERRED MINIMUM SLOPE IS 2%.

ANY EXCAVATION REQ'D. TO COMPLETE THE OVERLAY OR THE PAVING BLOCK AT ABUTS. IS INCIDENTAL TO THE BID ITEM, "CONCRETE MASONRY, OVERLAY, DECKS".

ALL DIMENSIONS ARE IN MILLIMETERS.

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

UNDER THE BID ITEM "CONCRETE MASONRY ANCHORS, TYPE "S", ANCHORED REINFORCING STEEL SHALL BE PAID FOR SEPARATELY AS PROVIDED IN SECTION 505 OF THE STANDARD SPECIFICATIONS FOR BAR STEEL REINFORCEMENT.

DESIGN DATA

LIVE LOAD:

INVENTORY RATING: MS-
OPERATIONAL RATING: MS - ---
MAXIMUM STANDARD PERMIT VEHICLE LOAD = --- MPa

ULTIMATE DESIGN STRESSES:

CONCRETE MASONRY SUPERSTRUCTURE $f'c = 4,000$ P.S.I.

TOTAL ESTIMATED QUANTITIES

BID ITEMS	UNIT	TOTAL
CONCRETE MASONRY, OVERLAY, DECKS	m ³	
CLEANING, DECKS	m ²	
PREPARATION, DECKS, TYPE 1	m ²	
PREPARATION, DECKS, TYPE 2	m ²	
PROTECTIVE SURFACE TREATMENT	L	
POSSIBLE ADDITIONAL BID ITEMS		
FULL DEPTH DECK REPAIR	m ²	
CURB REPAIR	m	
JOINT REPAIR	m ²	
CONCRETE SURFACE REPAIR	m ²	
RUPTURED VOID REPAIR	m ²	
EPOXY CRACK SEALING	m	
EXPANSION DEVICE, STRUCTURE B- -	L.S.	
CONCRETE MASONRY ANCHORS, TYPE L, NO. BAR	EACH	
CONCRETE MASONRY ANCHORS, TYPE S, NO. BAR	EACH	
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	kg	
ADJUSTING FLOOR DRAINS	EACH	
DECK GRINDING	m ²	
REMOVING CONCRETE MASONRY DECK OVERLAY	m ²	

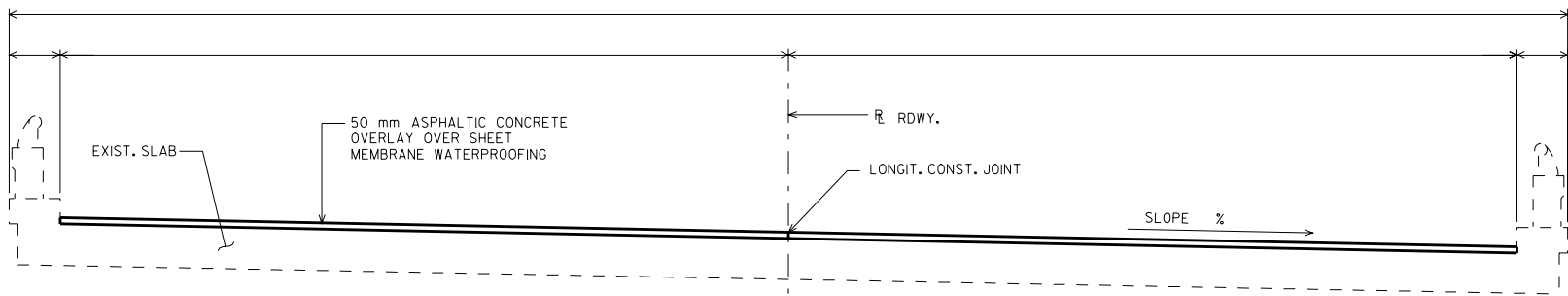
CONCRETE OVERLAY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

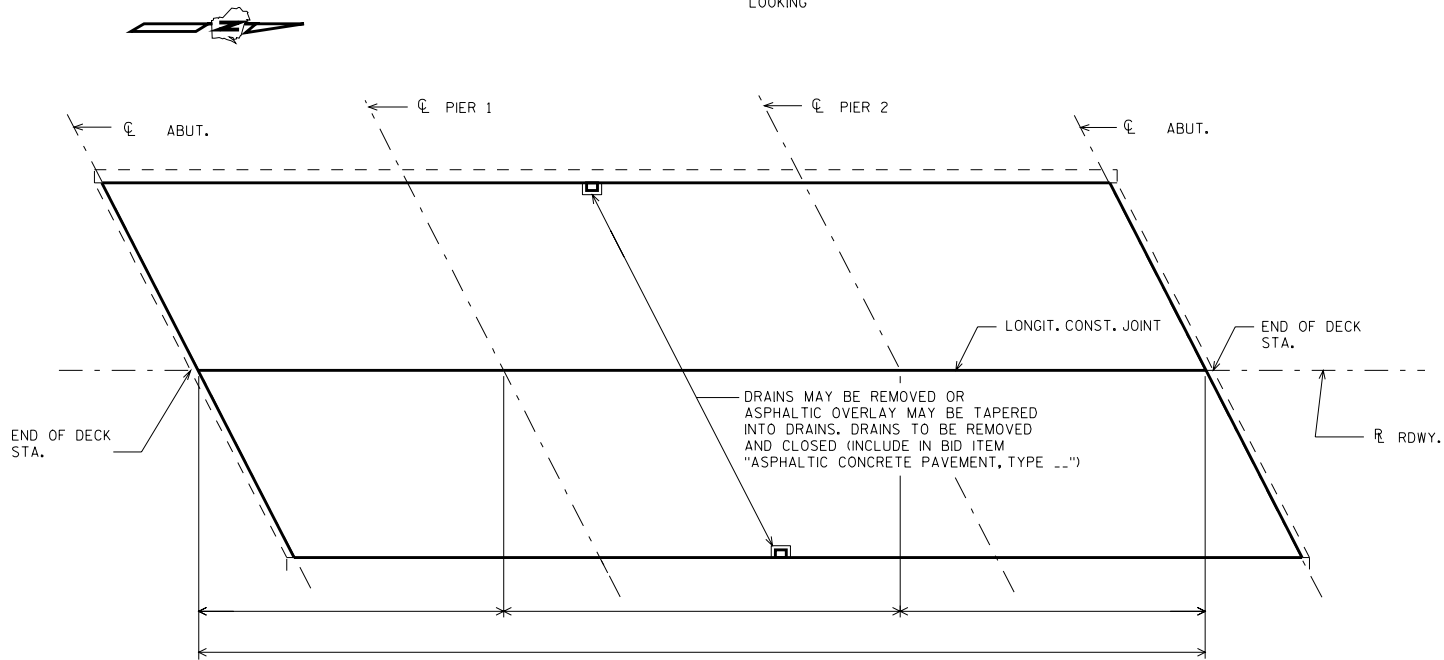
DATE:

8/99



CROSS SECT. THRU RDWY.

LOOKING



PLAN

NOTE:

PROFILE GRADE LINE SHALL BE DETERMINED BASED ON A MINIMUM OVERLAY THICKNESS OF 50 mm PLACED ABOVE THE DECK SURFACE AFTER CLEANING.

EXPECTED AVERAGE OVERLAY THICKNESS IS 2" (OR AS GIVEN BY THE DESIGN ENGINEER). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN 1/2", CONTACT THE STRUCTURES DESIGN SECTION. TOP OF EXISTING DECK ELEVATIONS SHALL BE DETERMINED FROM A FIELD SURVEY AT LOCATIONS DEEMED NECESSARY FOR ESTABLISHING OVERLAY THICKNESS FOR ACCURATE RATINGS AND POINT OF MINIMUM THICKNESS.

FOR CROSS SECTIONS NOT IN SUPERELEVATION TRANSITIONS THE PREFERRED MINIMUM SLOPE IS 2%.

ANY EXCAVATION REQ'D. TO COMPLETE THE OVERLAY OR THE PAVING BLOCK AT ABUTS. IS INCIDENTAL TO THE BID ITEM, "ASPHALTIC CONCRETE PAVEMENT, TYPE --".

ALL DIMENSIONS ARE IN MILLIMETERS.

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

UNDER THE BID ITEM "CONCRETE MASONRY ANCHORS, TYPE "S", ANCHORED REINFORCING STEEL SHALL BE PAID FOR SEPARATELY AS PROVIDED IN SECTION 505 OF THE STANDARD SPECIFICATIONS FOR BAR STEEL REINFORCEMENT.

DESIGN DATA

LIVE LOAD:

INVENTORY RATING; MS-
OPERATIONAL RATING; MS - ---
MAXIMUM STANDARD PERMIT VEHICLE LOAD = --- MPa

ULTIMATE DESIGN STRESSES:

CONCRETE MASONRY SUPERSTRUCTURE $f'_c = 4,000$

TOTAL ESTIMATED QUANTITIES

BID ITEMS	UNIT	TOTAL
ASPHALTIC CONCRETE PAVEMENT, TYPE --	Mg	
ASPHALTIC MATERIAL FOR PLANT MIXES	Mg	
SHEET MEMBRANE WATERPROOFING	m ²	
PREPARATION, DECKS, TYPE 1	m ²	
PREPARATION, DECKS, TYPE 2	m ²	
POSSIBLE ADDITIONAL BID ITEMS		
FULL DEPTH DECK REPAIR	m ²	
CURB REPAIR	m	
JOINT REPAIR	m ²	
CURB RESURFACING	m	
RUPTURED VOID REPAIR	m ²	
EPOXY CRACK SEALING	m	
SAWING PAVEMENT, DECK PREPARATION AREAS	m	
EXPANSION DEVICE, STRUCTURE B- -	L.S.	
CONCRETE MASONRY ANCHORS, TYPE L, NO. BAR	EACH	
CONCRETE MASONRY ANCHORS, TYPE S, NO. BAR	EACH	
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	kg	
ADJUSTING FLOOR DRAINS	EACH	
DECK GRINDING	m ²	
CONCRETE MASONRY DECK PATCHING	m ³	
GROUTING BRIDGE DECKS	L.S.	
REMOVING CONCRETE MASONRY DECK OVERLAY	m ²	

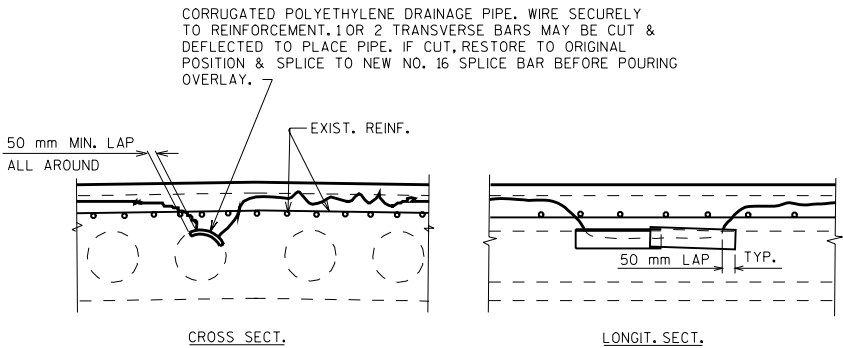
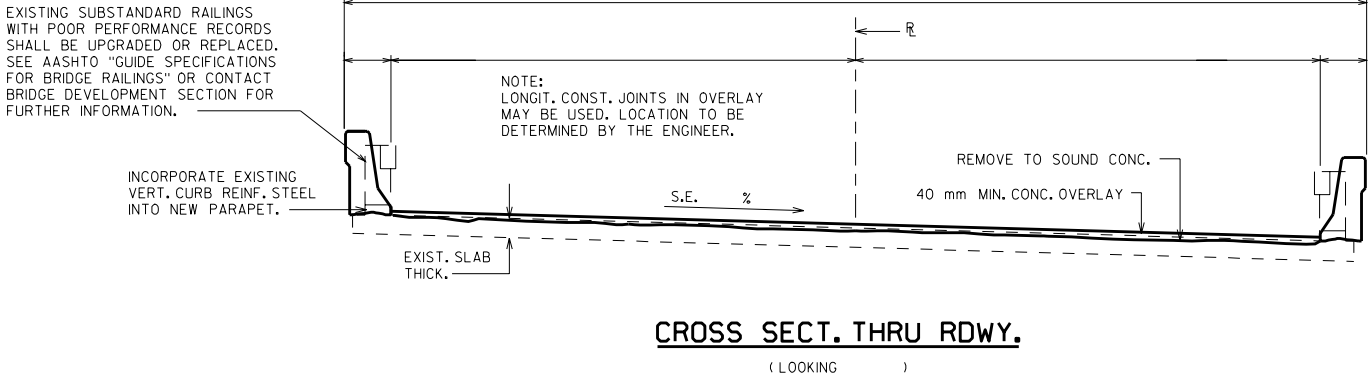
ASPHALTIC OVERLAY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

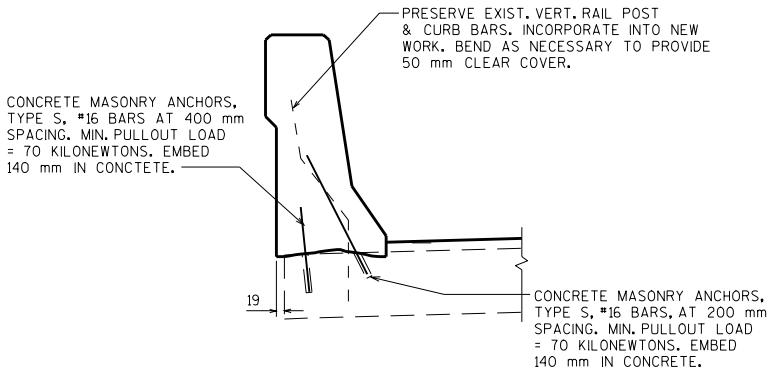
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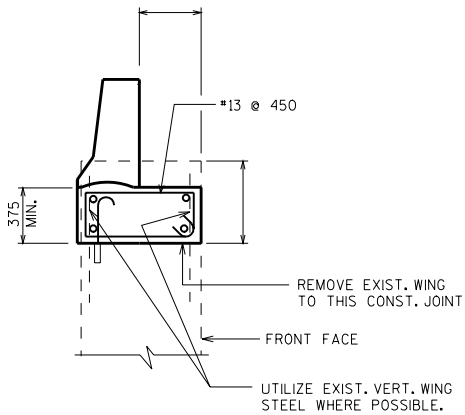
8/99



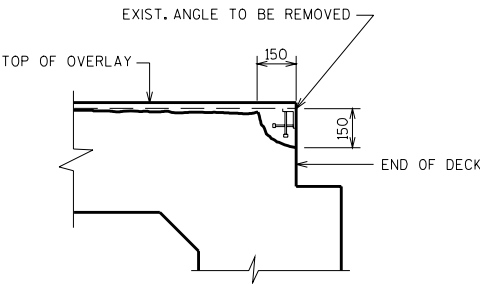
RUPTURED VOID REPAIR



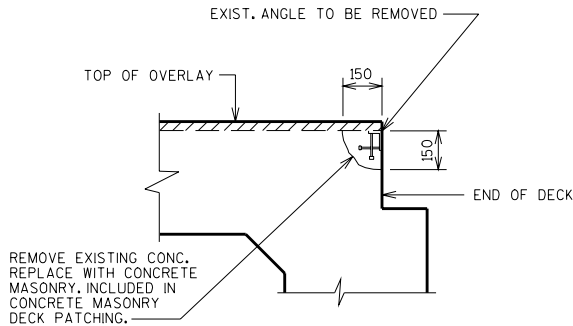
**SECTION THRU
PARAPET ON BRIDGE**



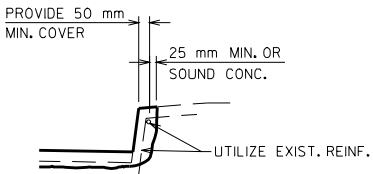
**SECTION THRU
PARAPET ON WING**



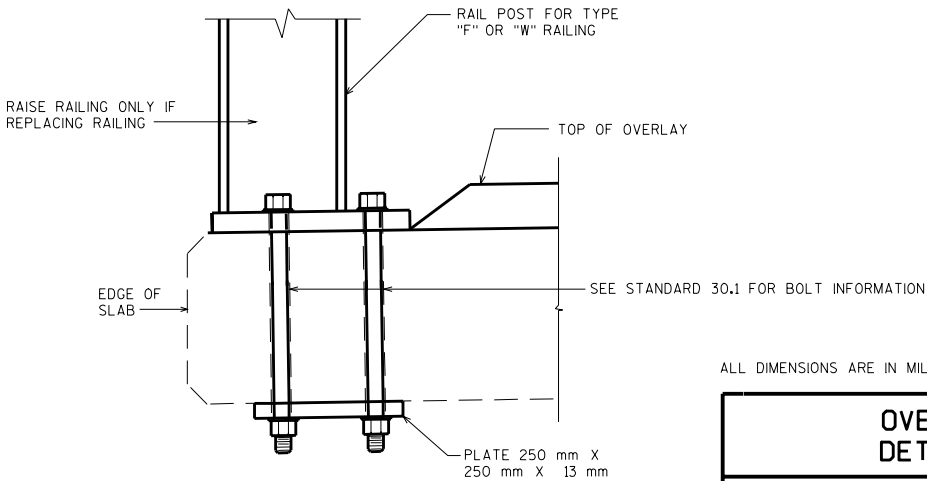
SECTION AT END OF SLAB
CONCRETE OVERLAY



SECTION AT END OF SLAB
ASPHALTIC OVERLAY

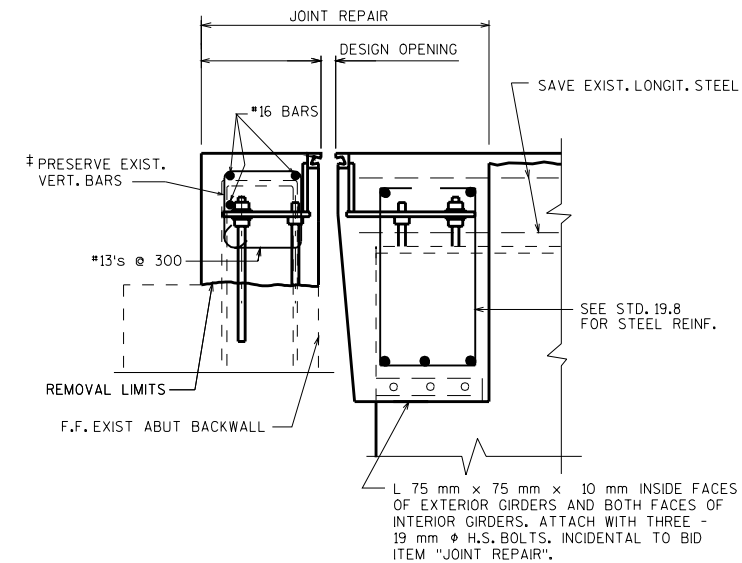


CURB DETAIL



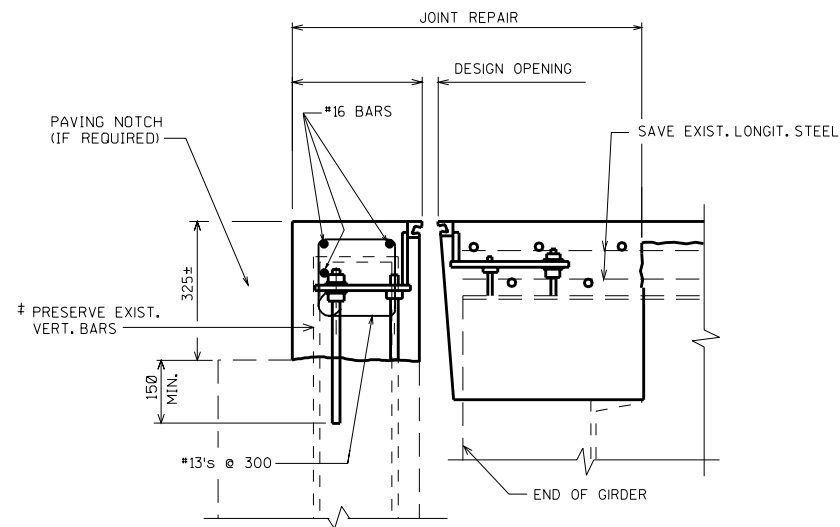
SECTION THRU RAILING
SHOWING ANCHORAGE IN SLAB

ALL DIMENSIONS ARE IN MILLIMETERS.	
OVERLAY DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 12/00

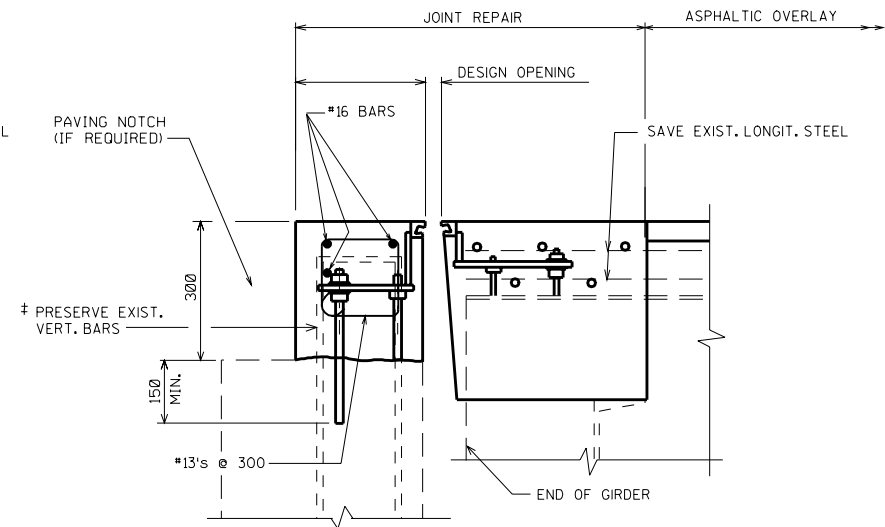


**SECTION THRU JOINT
STEEL GIRDER WITHOUT END DIAPHRAGM**

‡ IF EXISTING BARS ARE SEVERELY CORRODED OR DAMAGED DURING CONCRETE REMOVAL, REPLACE WITH "CONCRETE MASONRY ANCHORS, TYPE S, NO. 16 BAR EMBEDDED 180 mm, MIN. PULLOUT LOAD = 80 KILONEWTONS. PLACE 100 mm CL. MIN. OF CONC. FACE. USE L-SHAPED #16 COATED REBAR.



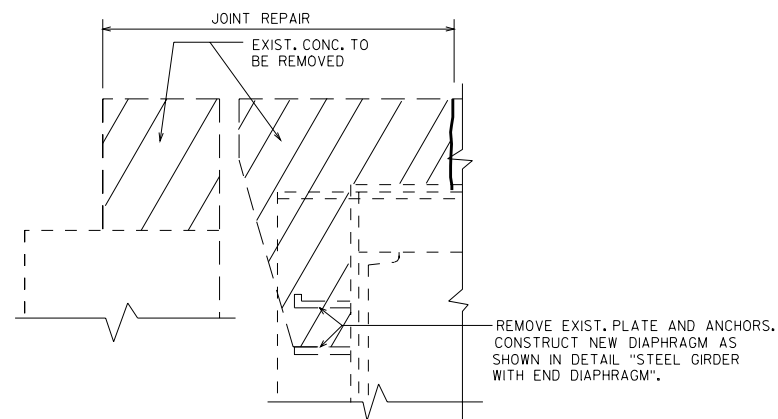
**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
CONCRETE OVERLAY**



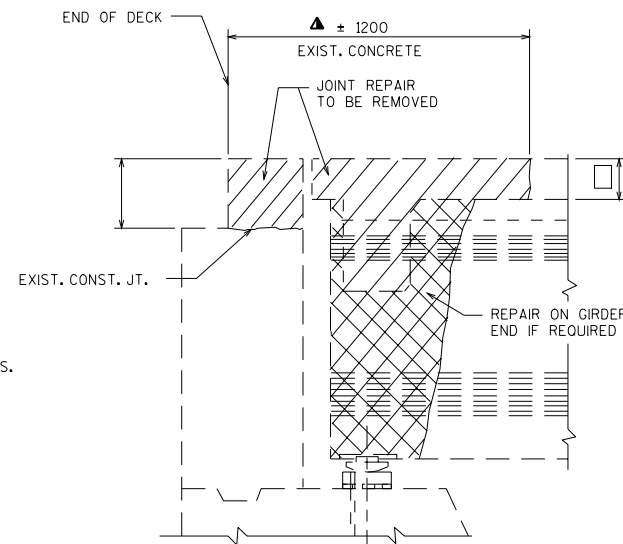
**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
ASPHALTIC OVERLAY**

TOTAL ESTIMATED QUANTITIES

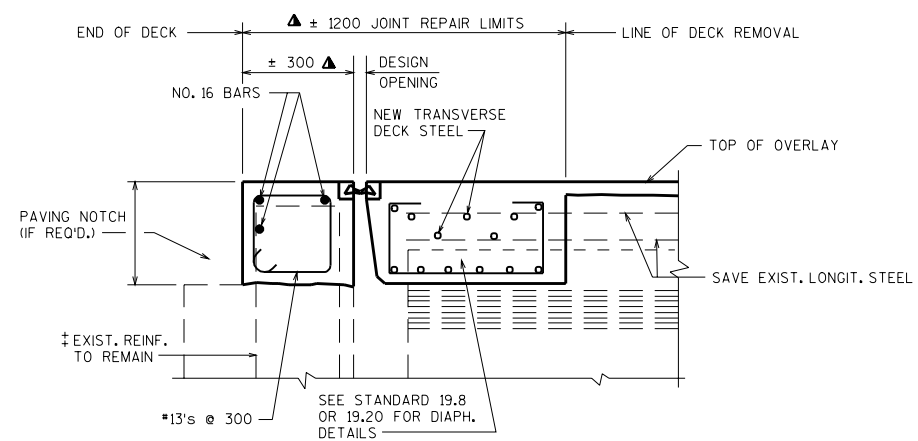
BID ITEMS	UNIT
JOINT REPAIR	m ² .
EXPANSION DEVICE, STRUCTURE B-	1 L.S.
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	kg.



**JOINT REPAIR-REMOVAL
STEEL GIRDER**



**JOINT REPAIR-REMOVAL
SECTION THRU JOINT-PRESTRESSED GIRDER**



Δ DIMENSIONS GIVEN ARE NORMAL TO CL OF SUBSTRUCTURE UNIT. UTILIZE EXISTING REINFORCEMENT

SEE STANDARD 28.1 FOR SUPPORTS USED WITH STRIP SEAL-STEEL EXTRUSIONS.

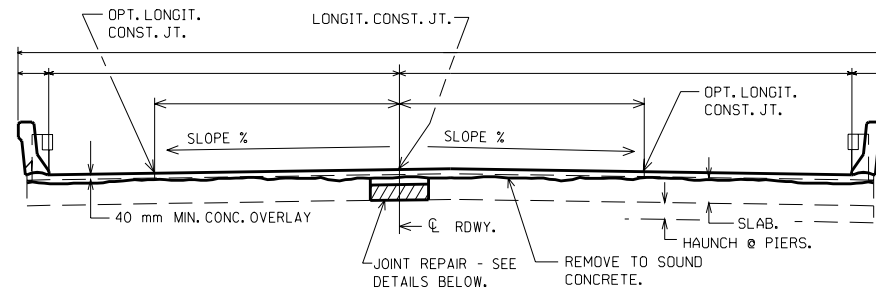
ALL DIMENSIONS ARE IN MILLIMETERS.

**STRIP SEALS & DIAPH.
DETAILS FOR OVERLAYS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

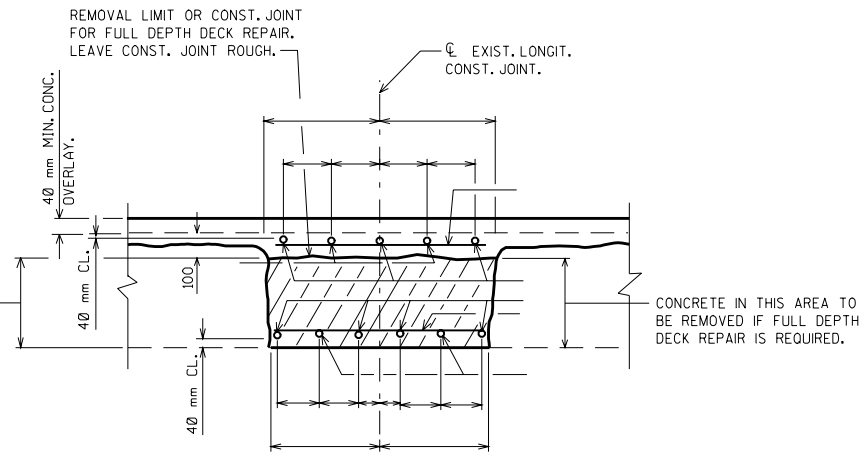
APPROVED: _____

DATE:
6/01

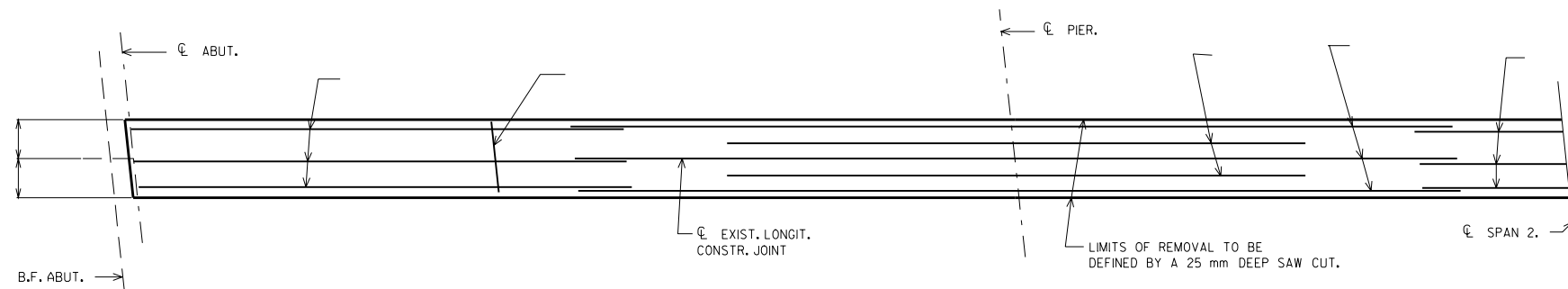


CROSS SECTION THRU ROADWAY LOOKING EAST

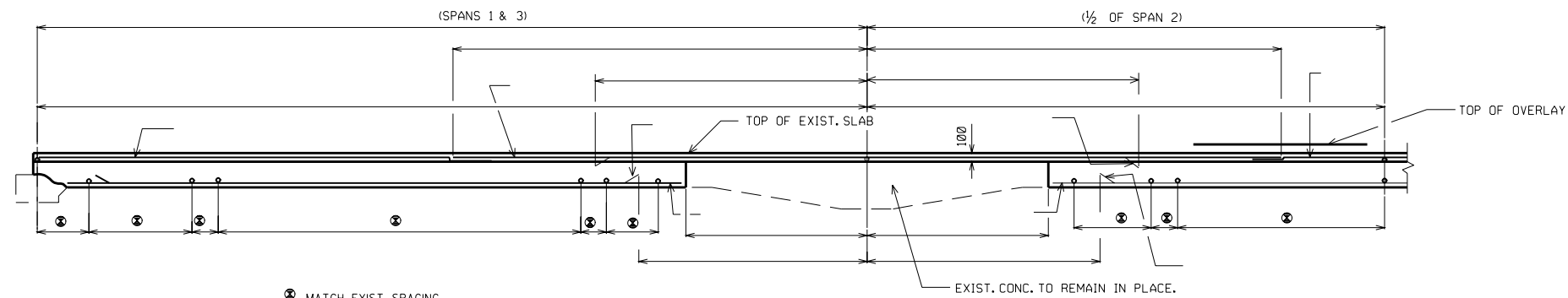
CONCRETE IN THIS AREA TO BE INCLUDED IN BID ITEM "CONCRETE MASONRY, BRIDGES" IF JOB REQUIRES OTHER "CONCRETE MASONRY, BRIDGES". OTHERWISE INCLUDE IN BID ITEM "CONCRETE MASONRY, OVERLAY, DECKS".



TYP. SECTION THRU JOINT



HALF PLAN SHOWING TOP BAR STEEL REINF.



HALF LONGIT. SECTION

TOTAL ESTIMATED QUANTITIES

BID ITEMS	
JOINT REPAIR	m ²
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	kg
CONCRETE MASONRY, BRIDGES	m ³
CONCRETE MASONRY, OVERLAY, DECKS	m ³

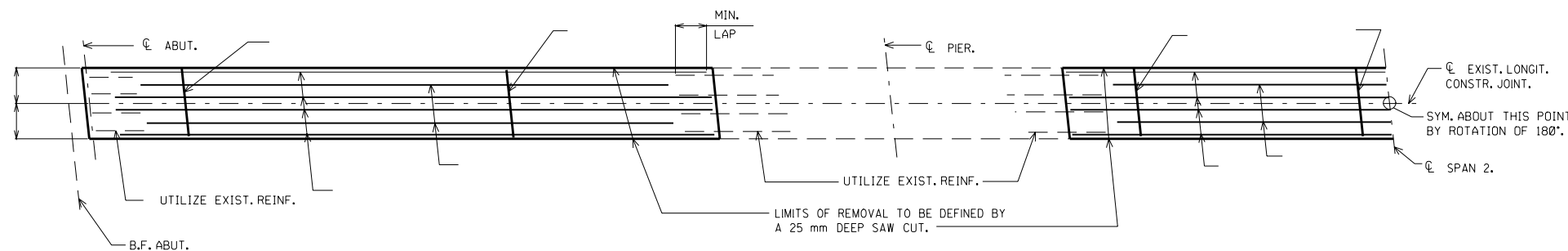
ALL DIMENSIONS ARE IN MILLIMETERS.

LONGIT. CONST. JOINT REPAIRS

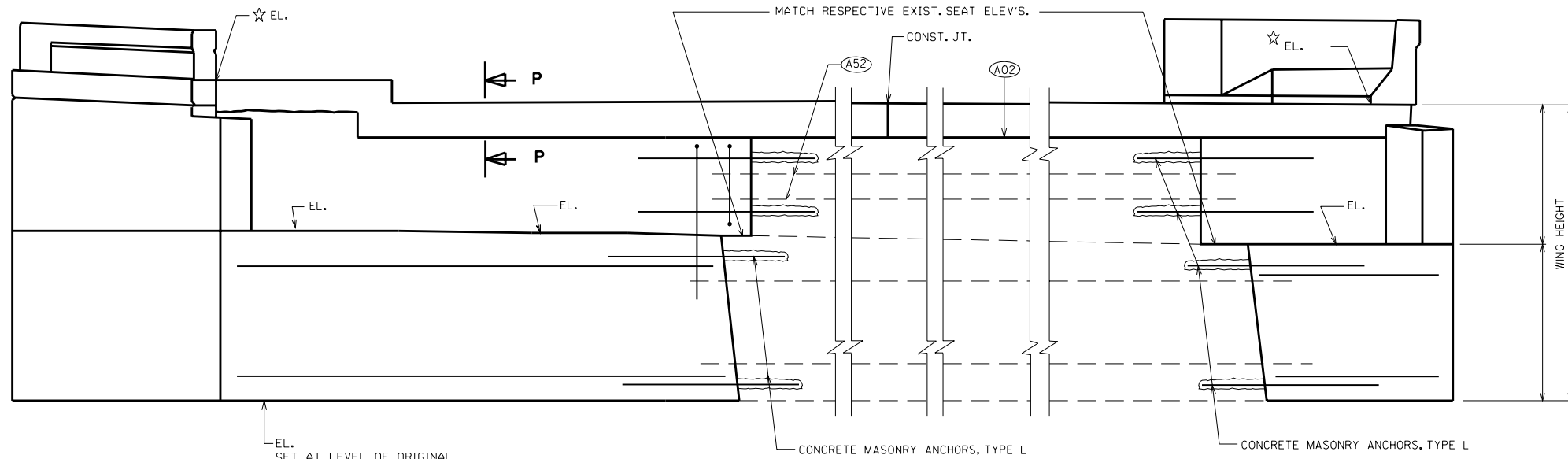
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99

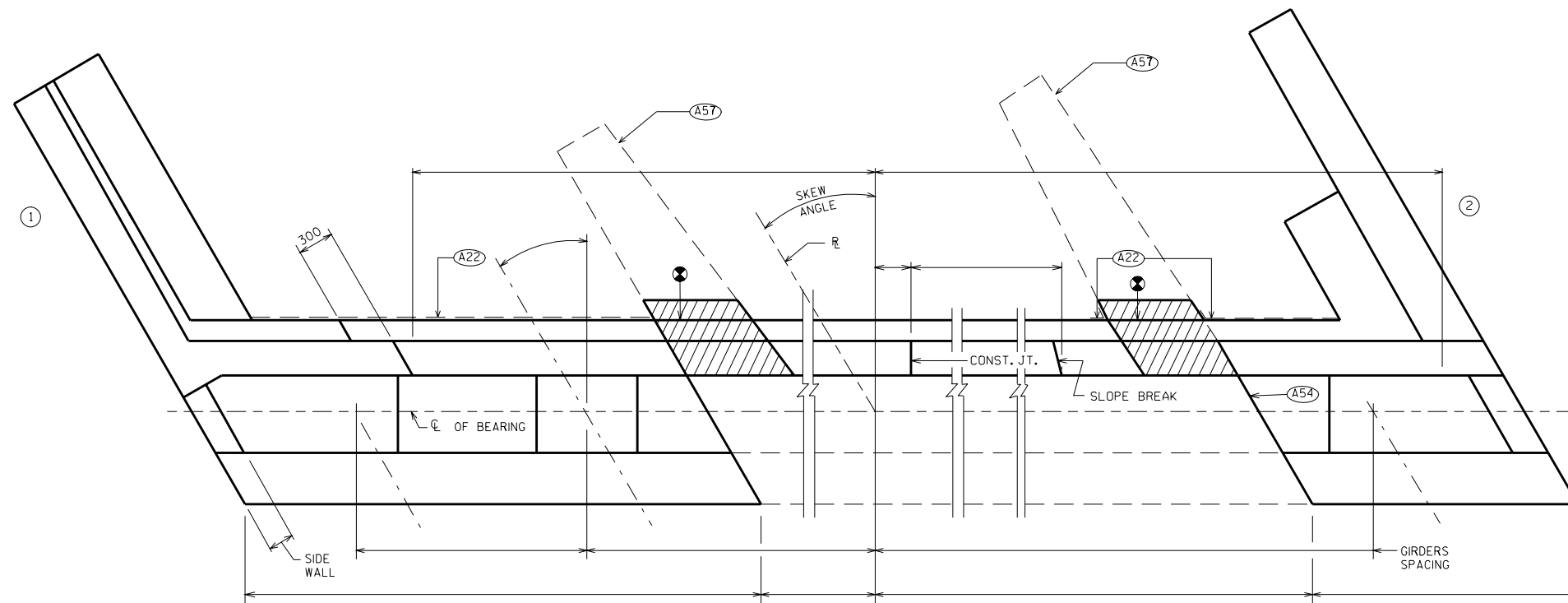
METRIC STANDARD 40.5



HALF PLAN SHOWING BOTTOM BAR STEEL REINF
(REQUIRED ONLY FOR FULL DEPTH DECK REPAIR)

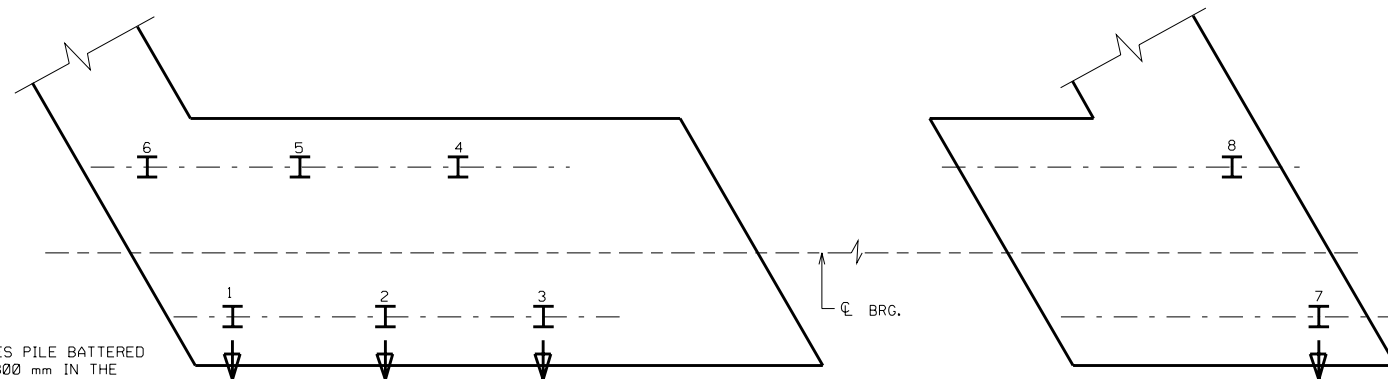


ELEVATION

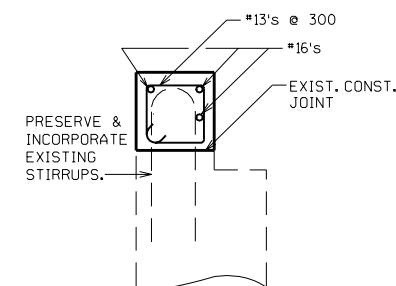


WING WITHOUT PILE

WING WITH PILE



PILE PLAN



SECTION P

NOTES

- (A02) CONSTRUCTION JOINT: POUR CONCRETE ABOVE THIS JOINT AFTER SUPERSTRUCTURE CONCRETE IS IN PLACE. STRIKE OFF AND LEAVE ROUGH.
- (A22) 450 (RMW) RUBBERIZED MEMBRANE WATERPROOFING SEAL ALL HORIZ. & VERT. JOINTS AT BACKFACE.
- (A52) SALVAGE EXIST. REINF. & EXTEND FULL LENGTH INTO NEW WORK.
- (A54) ROUGHEN SURFACE OF CONCRETE 6 mm DEEP MIN. ALL AREAS OF NEW TO EXIST. CONCRETE CONTACT.
- (A57) EXIST. WINGS. REMOVE A MIN. OF 600 mm BELOW FINISHED GRADE.
- ☆ ELEV. @ F.F. ABUT. BACKWALL AND GUTTERLINE.
- ⊗ REMOVE CONC. IN THIS AREA DOWN TO EXIST. BRIDGE SEAT. INCORPORATE EXIST. BAR STEEL INTO NEW WORK.

DESIGNER NOTES

SEE CHPT. 12 FOR NEW BAR STEEL PLACEMENT, DETAILS, DIMENSIONS, & NOTES.

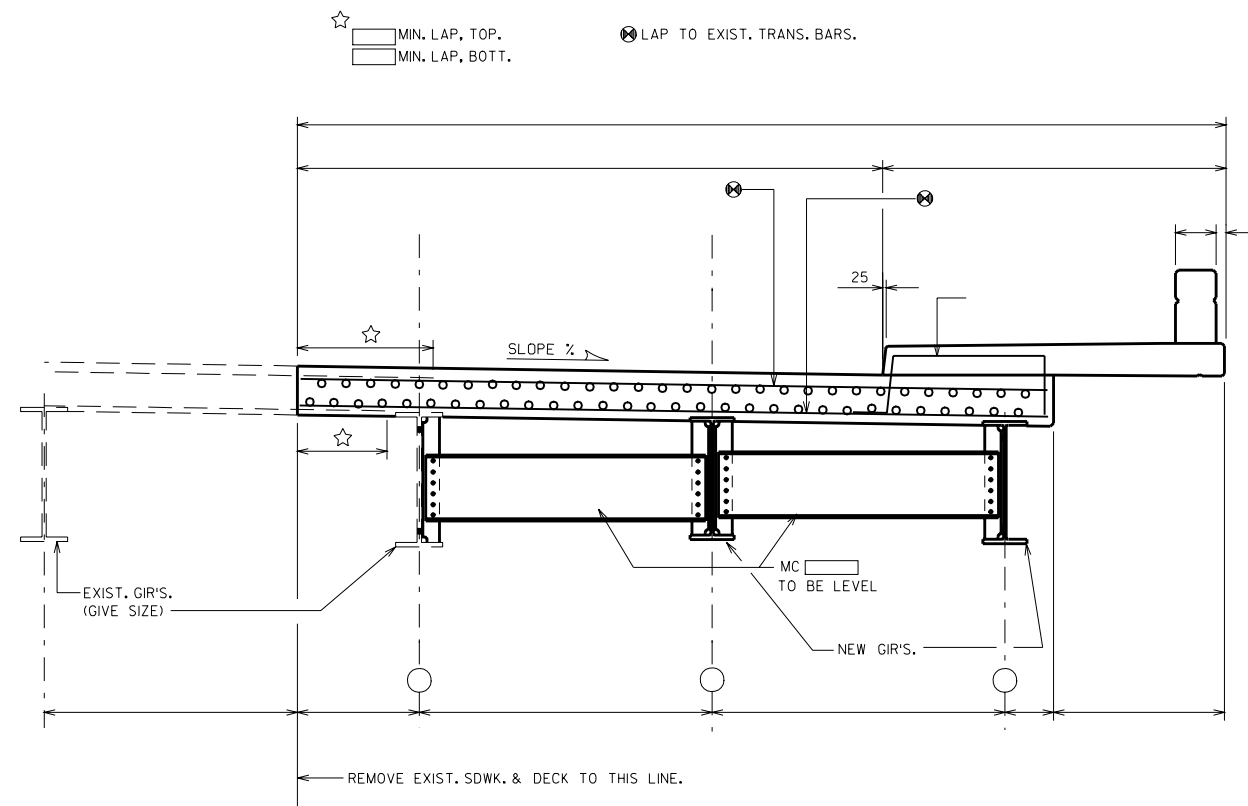
ALL DIMENSIONS ARE IN MILLIMETERS.

ABUTMENT WIDENING

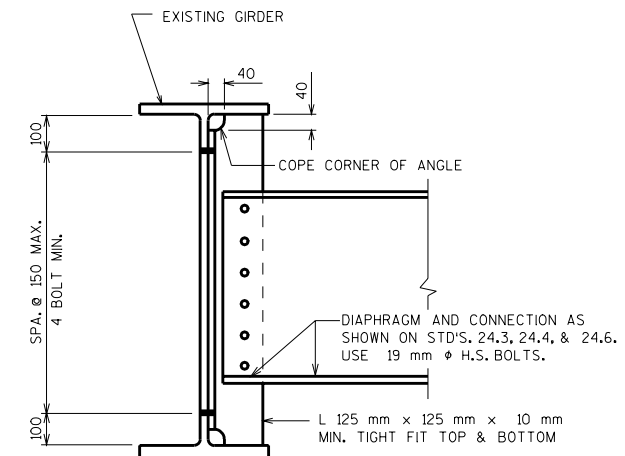
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

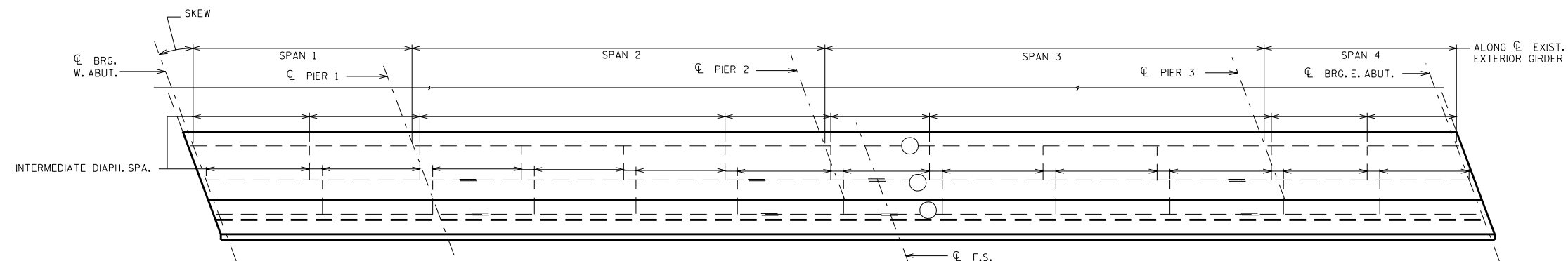
DATE:
12/00



CROSS SECT. THRU RDWY.



DIAPHRAGM CONNECTION TO
EXISTING STEEL GIRDER



PLAN

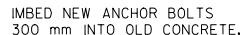
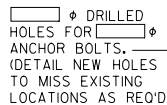
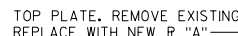
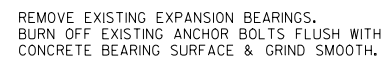
ALL DIMENSIONS ARE IN MILLIMETERS.

SLAB WIDENING

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

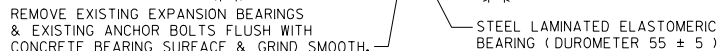
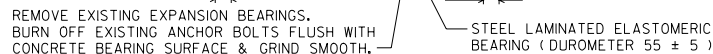
DATE:
8/99



SEE STANDARD 27.1 & 27.8 FOR BEARING DETAILS

ELEVATION

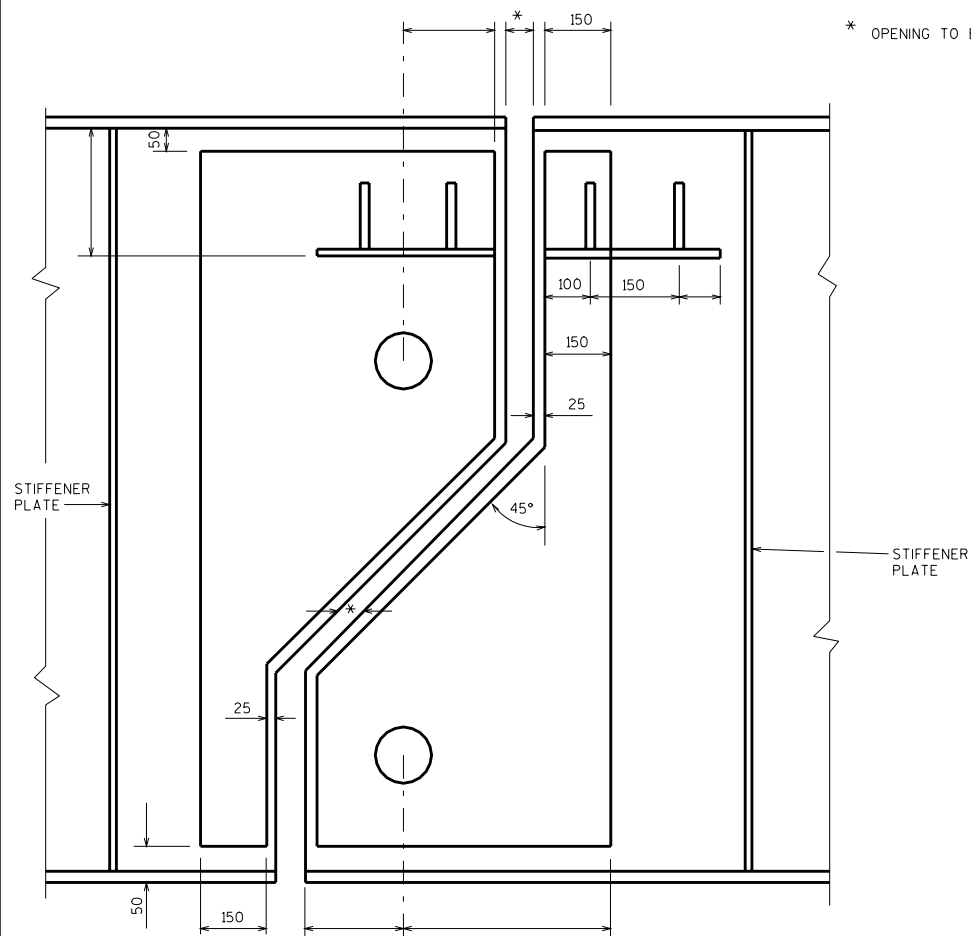
(MAY BE USED IN LIEU OF PLATE 'F')



NOTE:
SEE STANDARD 27.7 FOR ADDITIONAL INFORMATION.
ALL DIMENSIONS ARE IN MILLIMETERS.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

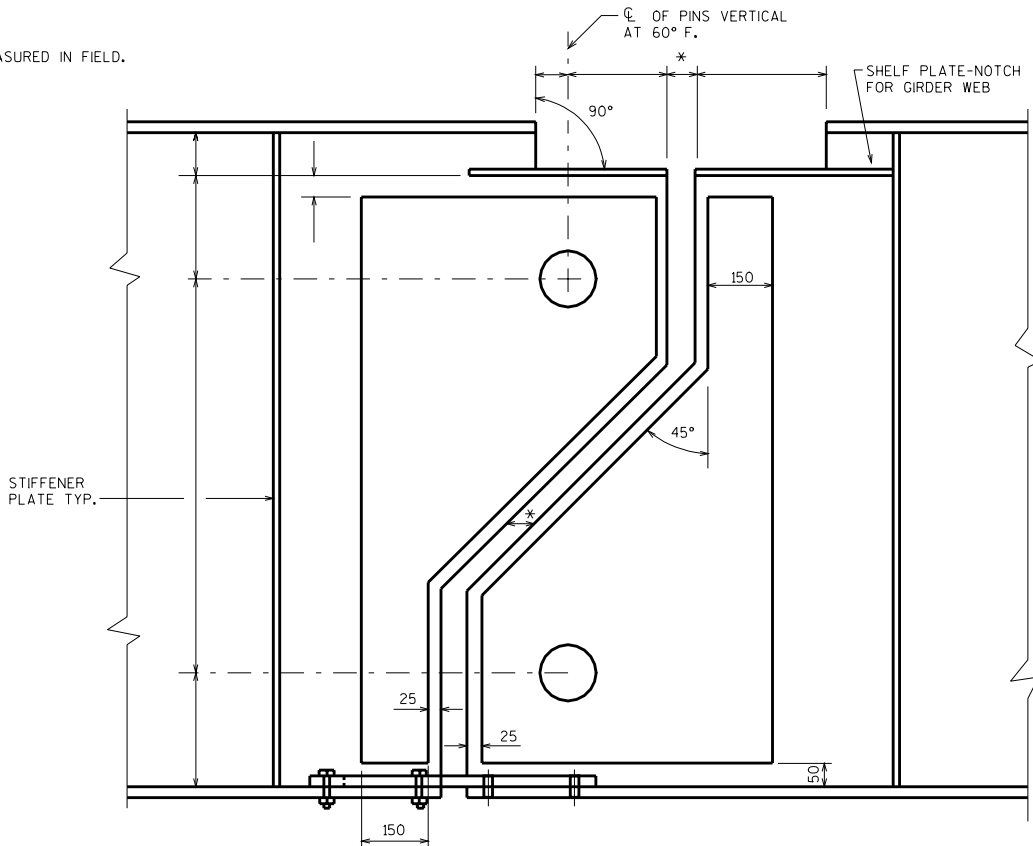
APPROVED: _____	DATE: 8/99
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TYPICAL HINGE DETAIL FOR WATERTIGHT EXPANSION DEVICE

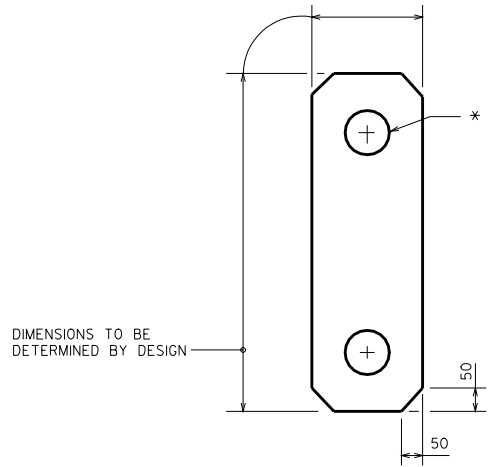
NOTE:
DETAILS NOT SHOWN ARE IDENTICAL TO DETAILS SHOWN
FOR "FINGER TYPE EXPANSION DEVICE".

* OPENING TO BE MEASURED IN FIELD.

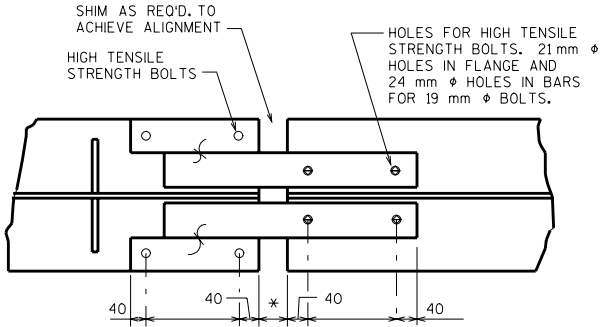


TYPICAL HINGE DETAIL FOR FINGER TYPE EXPANSION DEVICE

(HANGER PLATES NOT SHOWN)

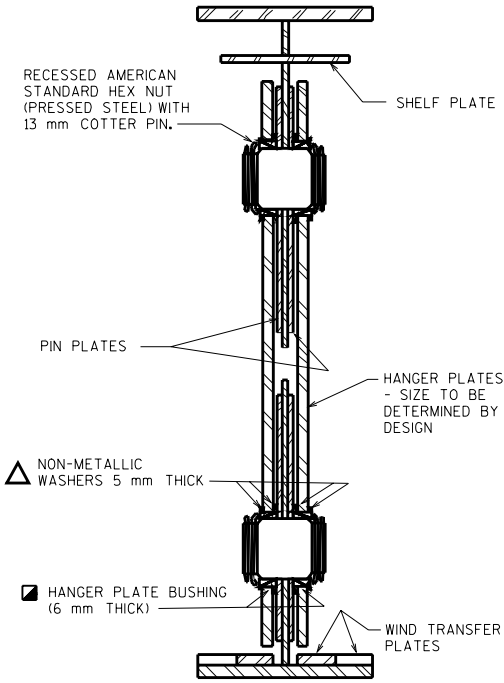


HANGER PLATE DETAIL



TYPICAL WIND TRANSFER PLATES DETAIL

CONTACT AREA OF WIND TRANSFER
PLATES TO BE FINISHED ANSI 125.



SECTION THRU HINGE

NOTES

INSIDE HOLES OF HANGER PLATES SHALL BE COATED WITH "BLOXIDE" OR AN APPROVED EQUAL AFTER FINISHING. THE BUSHINGS SHALL HAVE A PRESS FIT INTO HANGER PLATES. THE INSIDE DIAMETER OF THE BUSHING SHALL PROVIDE A CLEARANCE OF 0.15 mm MINIMUM AND 0.25 mm MAXIMUM OVER THE FINISHED DIAMETER OF THE PIN. NOTE THAT THE HOLE DIAMETER SHALL BE SMALLER THAN THE BUSHING O.D. BY AT LEAST .02 mm. FINISH ANSI125.

ALL DIMENSIONS ARE TO BE FIELD VERIFIED BY THE CONTRACTOR.

REMOVE EXISTING HANGER PLATES, PINS, AND WIND TRANSFER PLATES AND REPLACE WITH NEW MATERIALS.

BID ITEM SHALL BE "HINGE REPLACEMENT", EACH. ALL MATERIAL AND WORK INVOLVED SHALL BE PAID FOR UNDER "HINGE REPLACEMENT".

NEW PINS SHALL BE 6 mm LARGER IN DIAMETER THAN EXISTING PINS. BORE OUT EXISTING PIN HOLES TO A DIAMETER EQUAL TO NEW PIN DIAMETER PLUS 0.15 mm TO 0.25 mm. FINISH ANSI125. GREASE INSIDE SURFACE OF HOLE. BORING PROCEDURE TO BE APPROVED BY ENGINEER.

BLAST CLEAN GIRDER WEB AND FLANGES WITHIN 600 mm OF ϕ OF HINGE IN ACCORDANCE WITH THE STEEL STRUCTURES PAINTING COUNCIL'S SPECIFICATION SSPC-SP6. PAINT AREA CLEANED WITH ORGANIC ZINC RICH PAINT SYSTEM.

HANGER PLATES AND WIND TRANSFER PLATES SHALL BE SHOP PAINTED.

BUSHINGS SHALL BE THE SAME LENGTH AS THE HANGER PLATE THICKNESS.

NON-METALLIC WASHERS SHALL HAVE AN INSIDE DIAMETER OF BETWEEN 0.1mm AND 0.25 mm LARGER THAN THE PIN DIAMETER.

PIN MATERIAL SHALL BE DETERMINED FROM THE ALLOWABLE STRESSES GIVEN IN AASHTO, "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", TABLE 10.32.4.3A. PINS SHALL CONFORM TO ONE OF THE FOLLOWING:

- ASTM A108 GRADES 1016 THROUGH 1030
- ASTM A668 CLASS C
- ASTM A668 CLASS D
- ASTM A668 CLASS F
- PINS TO BE FINISHED ANSI63.

▣ BUSHINGS SHALL BE GAR-MAX AS MANUFACTURED BY GARLOCK BEARINGS, INC. OR DURALON JOURNAL BEARINGS AS MANUFACTURED BY REXNORD BEARING DIVISION, OR APPROVED EQUALS. BUSHINGS SHALL HAVE A NOMINAL WALL THICKNESS OF 6 mm.

△ NON-METALLIC WASHERS REQUIRED FOR USE AS SPACERS BETWEEN THE PIN PLATES AND THE HANGER PLATES AND THE HANGER PLATES AND NUTS SHALL BE MADE FROM ONE OF THE FOLLOWING MATERIALS:

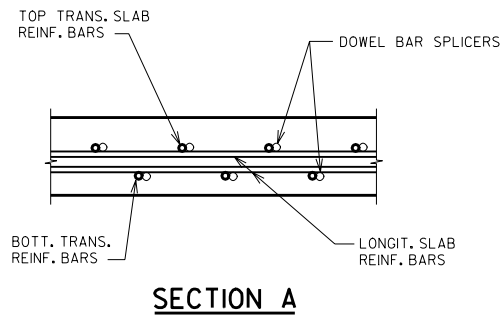
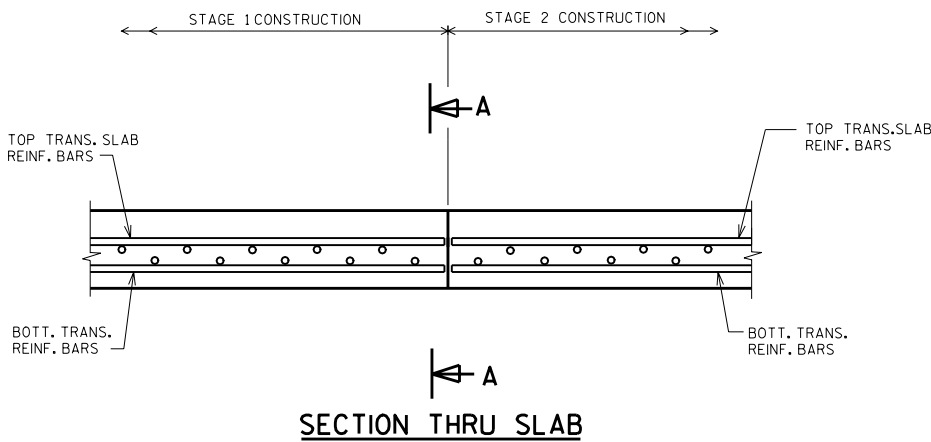
1. PHENOLIC, CANVAS REINFORCED, MIL-P-15035
2. POLYETHYLENE, HIGH DENSITY, BLACK ASTM D 1248, TYPE III, CLASS B
3. ACETAL, FEDERAL SPECIFICATION L-P-392
4. TEFLON TFE, MIL-P-22241A

ALL DIMENSIONS ARE IN MILLIMETERS.

HINGED JOINT REHABILITATION

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99



DOWEL BAR SPLICER LAP LENGTHS

CONCRETE UNDER BAR	BAR SIZE	13	16	19	22	25	29	32	36
300 mm OR LESS	f'c = 24	500	800	950	1300	1700	2100	2700	3300
	f'c = 28	500	800	950	1200	1550	1950	2500	3050
MORE THAN 300 mm	f'c = 24	700	900	1050	1450	1900	2400	3050	3750
	f'c = 28	700	900	1050	1350	1750	2250	2800	3450

BAR LENGTH COMPUTED TO ϕ LONGIT. JOINT AND SHALL BE MODIFIED IF REQ'D. TO BAR COUPLER MANUFACTURER RECOMMENDATIONS. PAY BASED ON BARS AS DETAILED.

NOTES

STEEL SPLICE (COUPLER) ASSEMBLY SHALL BE AN APPROVED TYPE AND SHALL DEVELOP IN TENSION AT LEAST 125% OF THE YIELD STRENGTH OF THE SPLICED REINFORCEMENT BARS.

DOWEL BAR SPLICERS SHALL BE OF MINIMUM 60 ksi YIELD STRENGTH, AND HAVE TENSILE STRENGTH AREA EQUAL OR GREATER THAN THAT OF THE LAPPED REINFORCEMENT BARS.

DOWEL BAR SPLICERS SHALL MEET THE DEFORMATION REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS.

FOR DOWEL BAR SPLICERS, ALL REINFORCEMENT BARS SHALL BE LAPPED AND TIED TO THE SPLICER BARS.

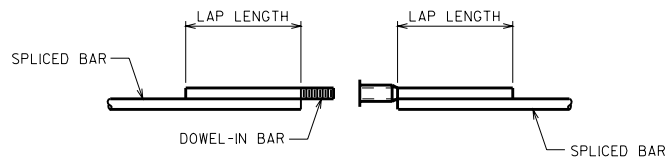
SPLICER (COUPLER) ASSEMBLY IN THE SLAB SHALL BE EPOXY COATED IN ACCORDANCE WITH THE REQUIREMENTS FOR REINFORCEMENT BARS.

OTHER SYSTEMS OF SIMILAR DESIGN MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL. APPROVAL SHALL BE BASED ON CERTIFIED TEST RESULTS FROM AN APPROVED TESTING LABORATORY THAT THE PROPOSED SPLICER (COUPLER) ASSEMBLY SATISFIES THE FOLLOWING REQUIREMENT:

① MINIMUM CAPACITY = $1.25 \times f_y \times \text{AREA OF SPLICED REINFORCEMENT BAR}$

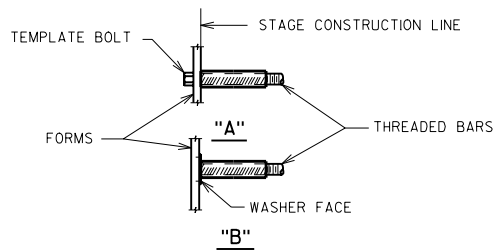
WHERE f_y = YIELD STRENGTH OF SPLICED REINFORCEMENT BARS

ALL DIMENSIONS ARE IN MILLIMETERS.

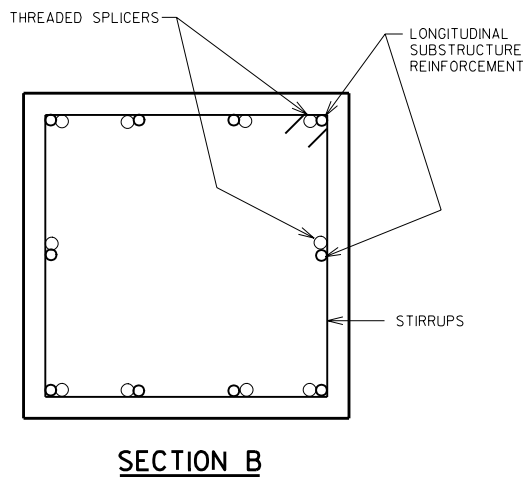
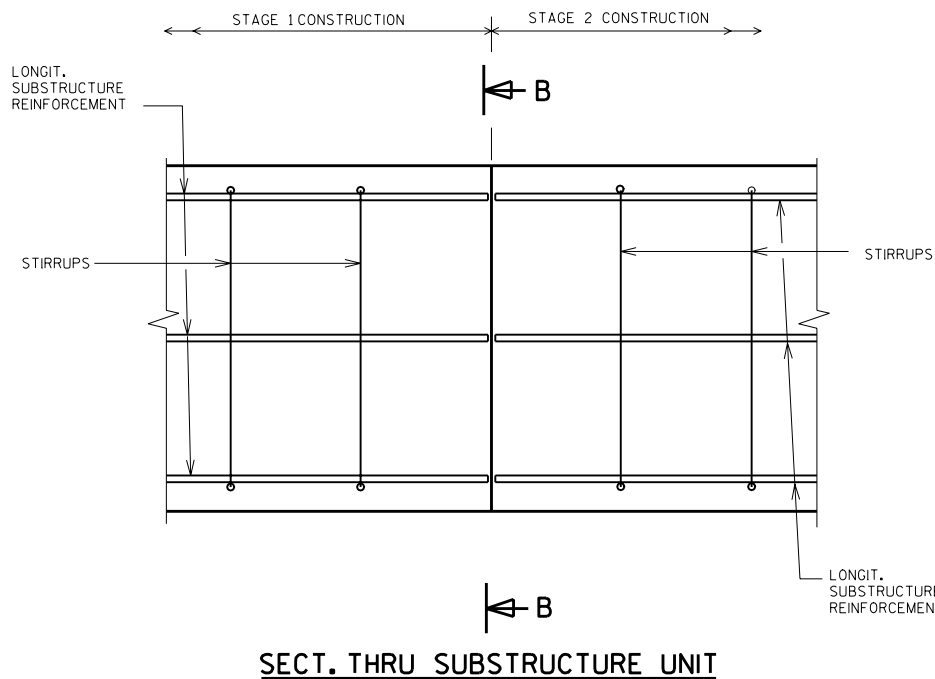


ONE PIECE THREADED SPLICER

SPLICER ALTERNATIVES



"A" SET SPLICER BY MEANS OF A TEMPLATE BOLT
 "B" SET SPLICER BY NAILING TO WOOD FORMS OR CEMENTING TO STEEL FORMS.

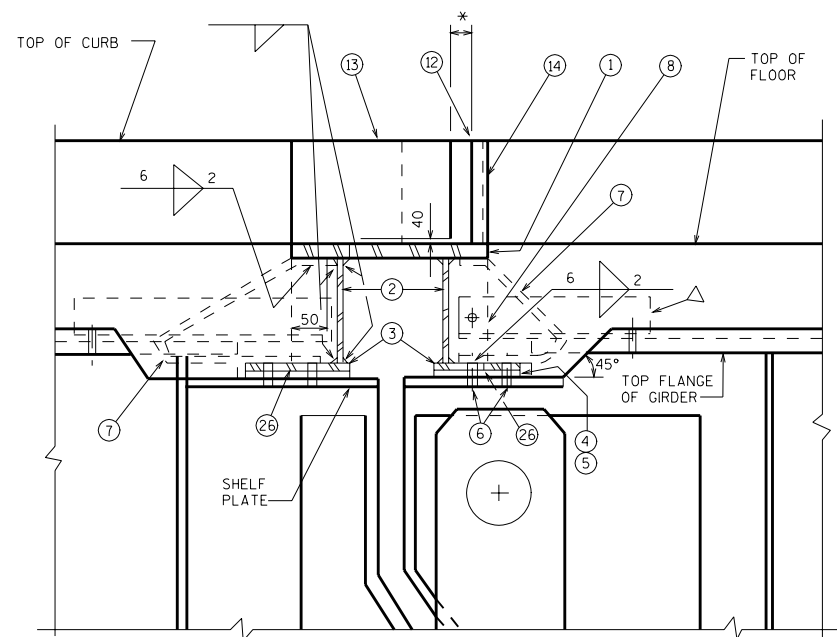


BAR SPLICER (COUPLER) DETAILS AT STAGE CONSTRUCTION

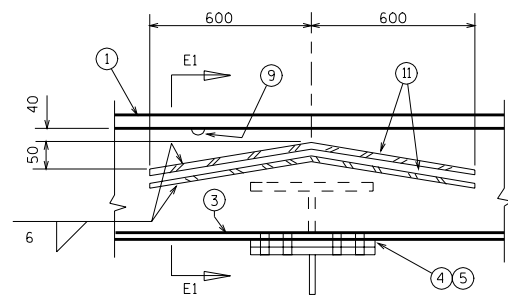
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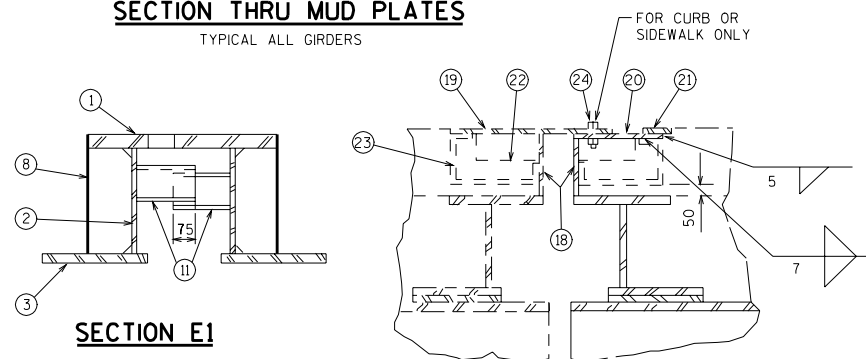
DATE:
 1/99



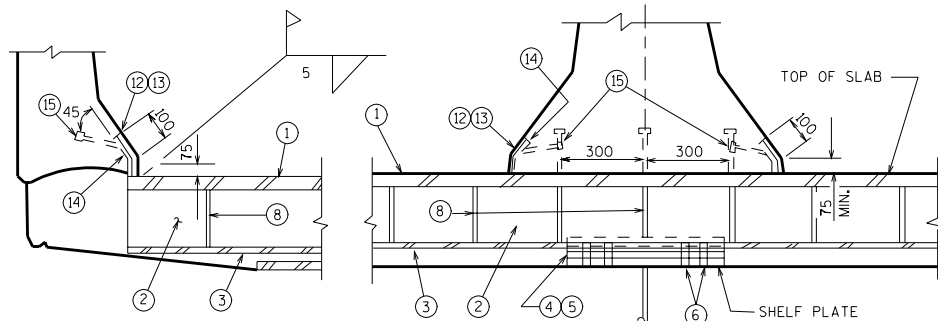
SECTION THRU JOINT
MUD PLATES NOT SHOWN



SECTION THRU MUD PLATES
TYPICAL ALL GIRDERS

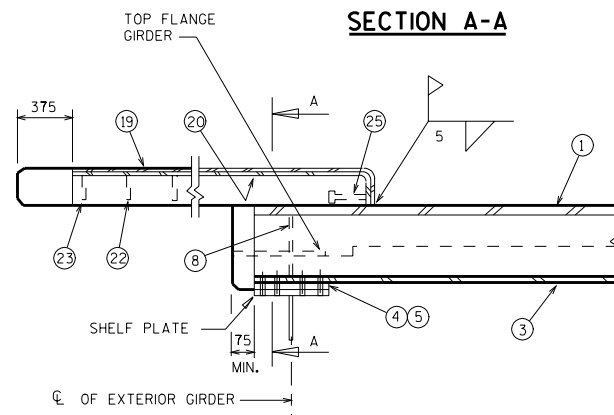


SECTION E1



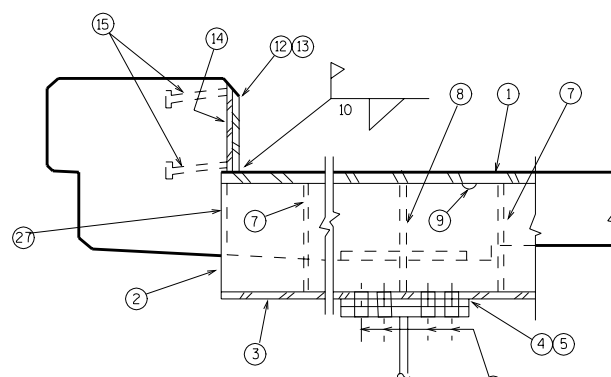
DETAIL AT PARAPET

DETAIL AT MEDIAN



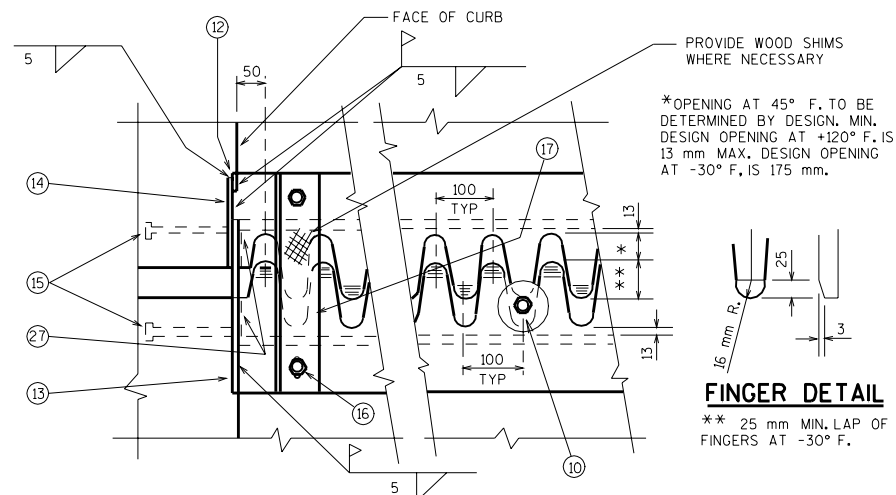
SECTION A-A

SECTION THRU SIDEWALK



SECTION THRU JOINT AT BRUSH CURB

MUD PLATES NOT SHOWN
△ ANGLE 90 mm x 90 mm x 8 mm FIELD DRILL 19 mm ϕ ERECTION BOLT HOLES OR WELD TO STIFFENER OR TOP FLG.



PART PLAN OF FINGER PLATE AT BRUSH CURB

NO SKEW

FINGER DETAIL

** 25 mm MIN. LAP OF FINGERS AT -30° F.

LEGEND

1. FINGER PLATE. SIZE TO BE DETERMINED BY DESIGN.
2. WEB PLATE. SIZE TO BE DETERMINED BY DESIGN.
3. FLANGE PLATE. SIZE TO BE DETERMINED BY DESIGN.
4. BEVELED SHIM PLATE 10 mm THICK. 24 mm ϕ HOLES FOR NO. 6.
5. 19 mm LAMINATED SHIM WITH SLOTTED OPENINGS
6. 19 mm ϕ ERECTION BOLTS. DRILL HOLES IN SHELF PLATE IN THE FIELD.
7. ANCHOR BAR 16 mm ϕ AT 300 mm CENTERS. BEND AS SHOWN.
8. STIFFENER BAR 10 mm THICK. 6 mm FILLET WELD ALL AROUND. PLACE AT ϕ OF GIRDER AND AT +600 mm CENTERS BETWEEN GIRDERS.
9. 21mm VENT HOLES AT 900 mm CENTERS.
10. 19 mm ϕ ADJUSTING BOLT AT APPROX. 1200 mm CENTERS WITH TWO 65 mm ϕ X 10 mm PLATE WASHERS. ONE ON EACH SIDE OF FINGER PLATE.
11. MUD PLATE 6 mm THICK
12. 10 mm PLATE. BEND AS SHOWN.
13. 10 mm PLATE BEND AS SHOWN.
14. 10 mm PLATE BEND AS SHOWN.
15. 16 mm ϕ STUDS X 160 mm LONG. WELD TO PLATES NO. 13 AND NO. 14.
16. 19 mm ϕ BOLT FOR SHIPPING. TACK WELD NUT TO BOTTOM OF PLATE NO. 1.
17. 75 mm ϕ X 75 mm ϕ X 6 mm + 1500 mm SPACING. SLOTTED HOLE 21 mm X 60 mm IN ONE END OF ANGLE AS SHOWN. FOR BOLT NO. 16.
18. CLOSING PLATE 10 mm CUT AS SHOWN. SEE WELD DETAIL
19. 10 mm PLATE. BEND AS SHOWN.
20. 10 mm PLATE. BEND AS SHOWN.
21. 10 mm PLATE. BEND AS SHOWN.
22. 10 mm PLATE. WELD ALL AROUND, 6 mm FILLET WELD TO PLATES NO. 18, 19, & 20.
23. 16 mm ϕ STUDS X 160 mm LONG. BEND AFTER WELD.
24. 19 mm ϕ BOLT WITH SQ. NUT. GREASE FOR EASY REMOVAL. 21 mm X 45 mm SLOTTED HOLE IN PL. NO. 19. LONG DIMENSION OF HOLE PARALLEL TO ϕ OF ROADWAY. TACK WELD NUT TO PLATE NO. 20 + 600 mm SPA.
25. 16 mm ϕ STUDS X 160 mm LONG. WELD TO PLATE NO. 20.
26. FLANGE PLATE. SAME THICKNESS AS PLATE NO. 3 AND SAME WIDTH AS SHELF PLATE. SHOP BUTT WELD TO PLATE NO. 3.
27. 10 mm CLOSING PLATE. WELD TO PLATES NO. 1 AND NO. 2.

NOTES

REMOVE ANGLE NO. 17 AND ADJUSTING BOLT NO. 10 AFTER VERTICAL AND HORIZONTAL ALIGNMENT IS SECURE IN FIELD. FILL HOLES WITH HOT POURED JOINT SEALER.

IN SOME CASES THE GIRDER FLANGES AND WEB PLATES DO NOT HAVE TO BE CUT TO ACCOMMODATE THE FINGER JOINT SECTION, THE SLAB DEPTH MAY BE UTILIZED EFFECTIVELY.

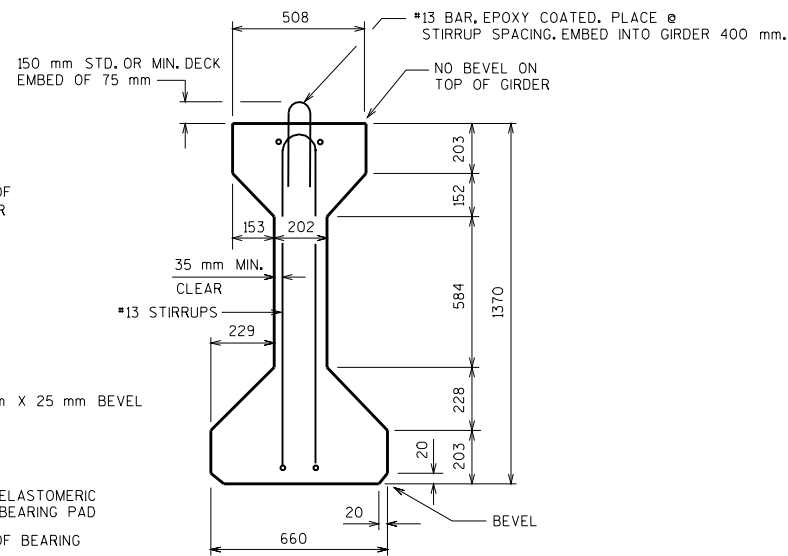
ALL DIMENSIONS ARE IN MILLIMETERS.

FINGER TYPE EXPANSION JOINT - PLATE GIRDER

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#13 BAR, EPOXY COATED. PLACE
 @ STIRRUP SPACING REQUIRED
 FOR NON WWF STIRRUPS. EMBED
 INTO GIRDER 380 mm.

50

D16 MINIMUM SIZE
 OF VERTICAL WIRE

25 mm MINIMUM CLEARANCE
 TO HORIZONTAL WIRE

CLEARANCE -
 32 mm MIN.,
 50 mm MAX.

1000

660

508

#13 BAR AT TOP OF GIRDER

#13 BAR AT BOTTOM OF GIRDER

50 mm C.L.

TOP VIEW OF GIRDER

The diagram illustrates the profile of a draped strand within a girder. Key dimensions and specifications include:

- "A"**: Vertical distance from the bottom of the girder to the end of the girder.
- END OF GIRDER**: The left vertical boundary of the girder.
- BOTTOM OF GIRDER**: The horizontal baseline of the girder.
- 12 1/2 % SLOPE MAX.**: The maximum slope of the strand profile.
- 1/4 POINT (0.25 L)**: A point on the strand profile.
- "B"**: Vertical distance from the center of gravity of the draped strands to the 1/4 point.
- HOLD DOWN POINT**: A point on the strand profile.
- CL OF GIRDER**: The centerline of the girder.
- CENTRE OF GRAVITY OF DRAPED STRANDS**: The point where the vertical distance "B" is measured.
- "C"**: Vertical distance from the center of gravity of the draped strands to the end of the girder.

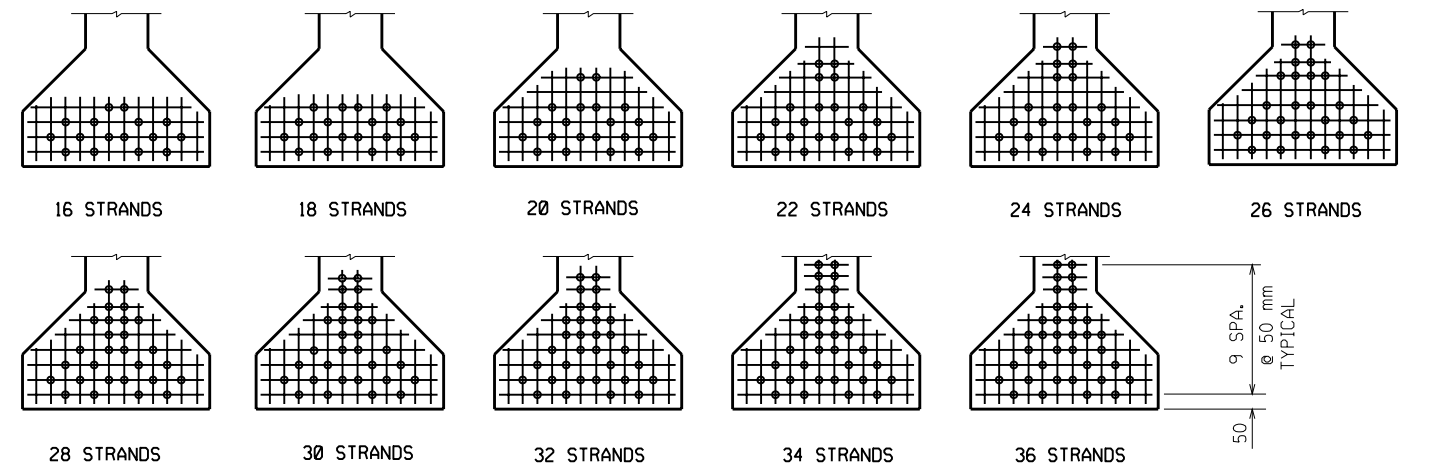
Formulas and Constraints:

- "A" TO BE GIVEN TO THE NEAREST 25 mm
- "B" = $\frac{1}{4} ("A" + 3 "C")$ MIN.
- "B" = $\frac{1}{4} ("A" + 3 "C") + 75$ mm MAX.

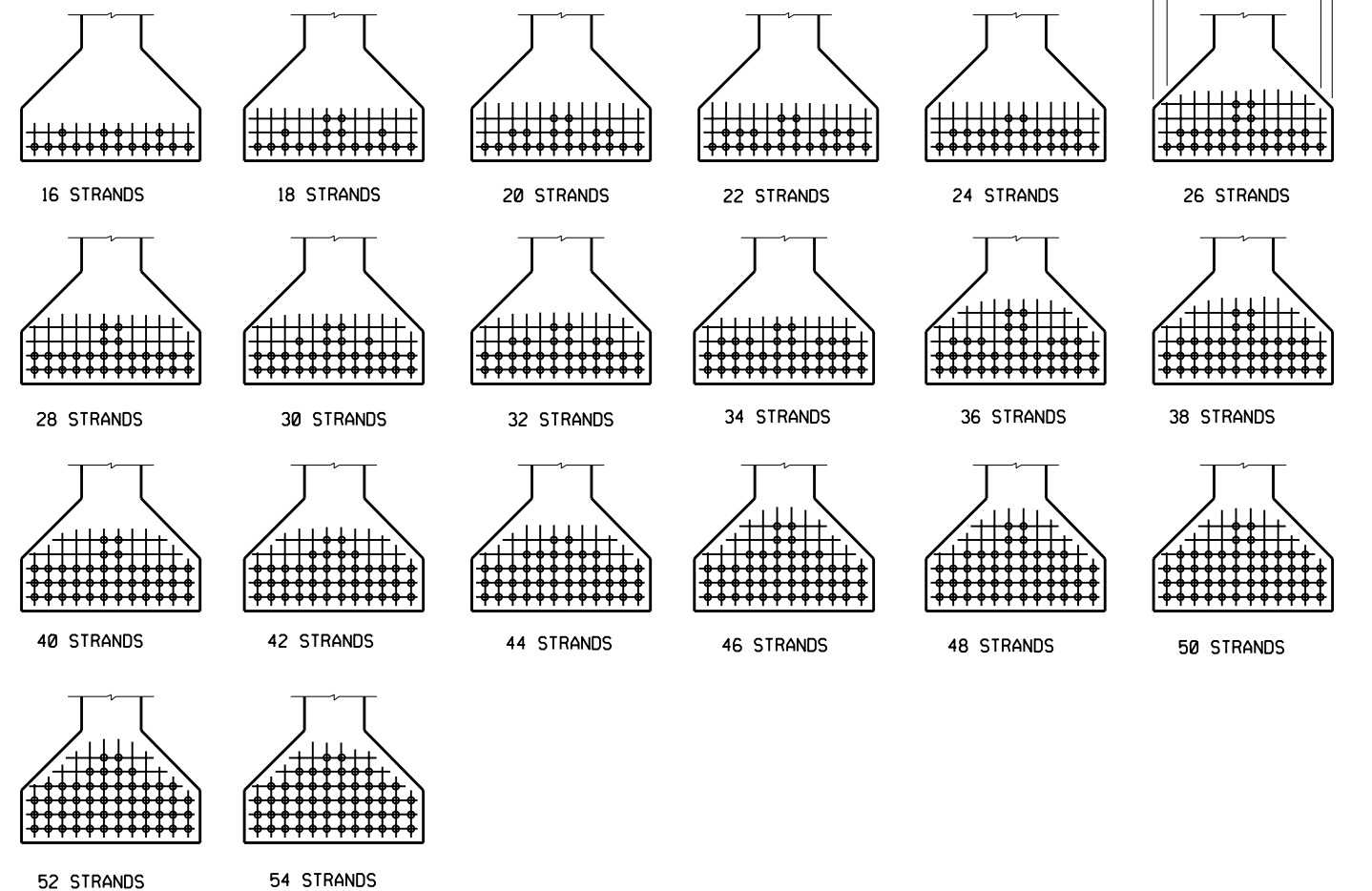
RECORD DIMENSIONS
 "A", "B" & "C"
 ON FINAL PLANS.

Diagram illustrating the reinforcement layout for a 9m long girder, showing the centerline and the reinforcement bars (#13 @ 150 mm) spaced at various intervals (300 mm, 450 mm, 530 mm) along the length. The diagram is labeled "SYM. ABOUT THIS POINT FOR GIRDERS WITHOUT CONTINUITY AT BOTH ENDS." and "SYM. ABOUT THIS POINT FOR GIRDERS WITH CONTINUITY AT BOTH ENDS.".

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STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS



ARRANGEMENT AT $\frac{L}{4}$ SPAN - FOR GIRDERS WITH DRAPED STRANDS

1370 mm GIRDER

$$A = 0.509 \text{ m}^2$$
$$r^2 = 21.321 \times 10^{-2} \text{ m}^2$$
$$y_T = 0.743 \text{ m}$$
$$y_B = 0.627 \text{ m}$$
$$I = 108.524 \times 10^{-3} \text{ m}^4$$
$$S_T = 14.598 \times 10^{-2} \text{ m}^3$$
$$S_B = 17.277 \times 10^{-2} \text{ m}^3$$
$$WT. = 12.0 \text{ kN/m}$$

PRE-TENSION

$$f'_s = 1860 \text{ MPa}$$
$$f_s = 0.75 \times 1860 \text{ MPa} = 1395 \text{ MPa}$$

for low relaxation strands.

$$P_i \text{ PER } 13 \text{ mm } \phi \text{ STRAND} = 9.877 \times 10^{-5} \text{ m}^2 \times 1395 \text{ MPa} = 137.8 \text{ kN}$$

$$\frac{y_B}{r^2} = 2.95 \text{ m/m}^2$$

(COMPRESSION IS NEGATIVE)

N NO. STRANDS	(1) e_s (meters)	(2) $(1 + \frac{e_s y_B}{r^2})$	(3) $(A/(2))$ (sq. m.)	(4) $P(Init.) = A_s f_s$ (kN)	(5) $f_B (Init.) = \frac{(4)}{(3)}$ (MPa)
STANDARD PATTERNS FOR UNDRAPED STRANDS					
16	0.514	2.513	0.203	2205	-10.890
18	0.504	2.484	0.205	2481	-12.110
20	0.486	2.431	0.209	2756	-13.160
22	0.467	2.374	0.214	3032	-14.140
24	0.446	2.313	0.220	3308	-15.030
26	0.436	2.285	0.223	3583	-16.080
28	0.432	2.273	0.224	3858	-17.230
30	0.415	2.222	0.229	4134	-18.050
32	0.412	2.214	0.230	4410	-19.180
34	0.395	2.162	0.235	4685	-19.900
36	0.394	2.159	0.236	4961	-21.040
STANDARD PATTERNS FOR DRAPED STRANDS					
16	0.565	2.663	0.191	2205	-11.540
18	0.555	2.634	0.193	2481	-12.840
20	0.552	2.626	0.194	2756	-14.220
22	0.550	2.619	0.194	3032	-15.600
24	0.548	2.614	0.195	3308	-16.990
26	0.538	2.585	0.197	3583	-18.200
28	0.537	2.583	0.197	3858	-19.580
30	0.533	2.570	0.198	4134	-20.870
32	0.530	2.560	0.199	4410	-22.180
34	0.526	2.551	0.200	4685	-23.480
36	0.518	2.525	0.202	4961	-24.610
38	0.516	2.519	0.202	5236	-25.910
40	0.514	2.514	0.202	5512	-27.220
42	0.510	2.501	0.204	5788	-28.440
44	0.506	2.490	0.204	6064	-29.660
46	0.498	2.467	0.206	6339	-30.720
48	0.495	2.458	0.207	6615	-31.940
50	0.492	2.450	0.208	6890	-33.160
52	0.487	2.436	0.209	7166	-34.300
54	0.483	2.424	0.210	7442	-35.440

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS SHOWN OTHERWISE.

1370 mm PRETENSIONED GIRDER DESIGN DATA

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